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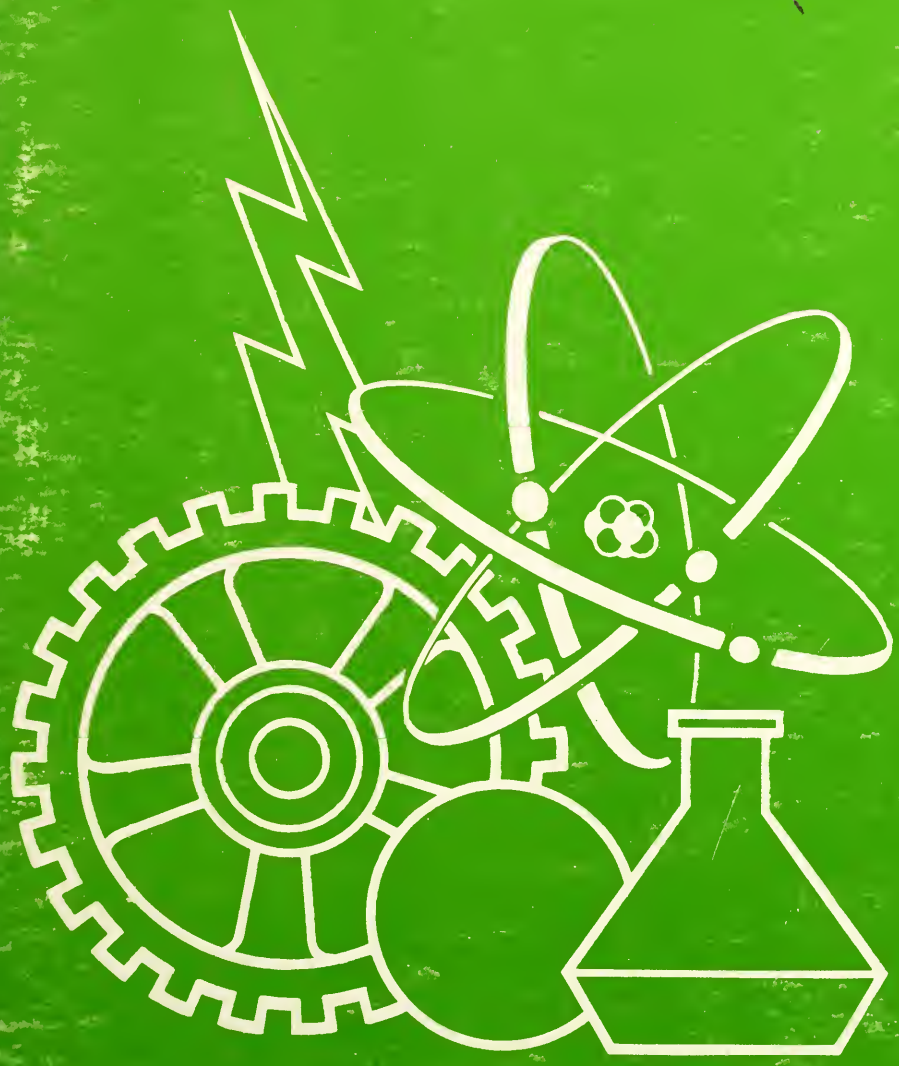

SYNTHETIC FUELS ▪ DECEMBER 1979

PATENT PROFILES

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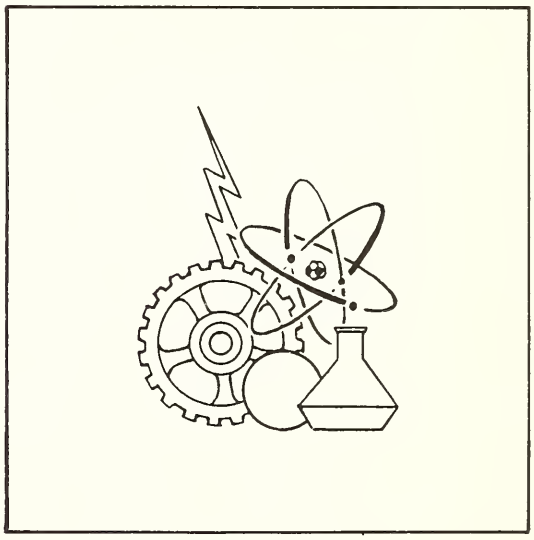

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INTRODUCTION

Background

Patents, as incentives for innovation are well established in the U.S. free enterprise system. Often overlooked, however, is a second great benefit of the patent system: the enormous, continually expanding patent file. This file includes more than 4 million distinct U.S. patents. These patents are classified and cross-referenced among the approximately 100,000 categories of technology that make up the U.S. Patent Classification System. Along with similarly categorized foreign patents and other technical publications they make up a collection totaling more than 23 million documents -- a collection which grows by over half a million documents annually.

Patent law requirements for a full disclosure of invention (which is then published as part of a patent grant) have resulted in an unique assemblage of technological information. Not only does the patent file embody the most comprehensive collection of technical information of its kind in the world, the information is inherently presented in a manner such that nearly every significant development in almost all technical fields flows in a natural time-series sequence -- virtually welcoming monitoring and analysis.

In its own unique way, this file represents a national resource. The Patent and Trademark Office (PTO) recognizes it heavy responsibilities not only to preserve, maintain, and improve the file, but, as well, to maximize its use for the greatest public benefit. It was as part of its effort to discharge this latter responsibility that the Patent and Trademark Office established, in 1971, its technology assessment and forecast program.

In its most general terms, the mission of the program is to stimulate and enhance the use and usability of the patent file, and to assemble, analyze and make available meaningful data about the file. In carrying out this mission, the Office of Technology Assessment and Forecast (OTAF), which administers the program, has assembled and built a master data base covering all U.S. patents. This data base has been used to support: (1) the preparation of a series or nine OTAF general distribution publications (see Appendix B); and (2) OTAF's special report services (see Appendix C).

Patent Profile

In an effort to continually provide data in a form which is useful and convenient to the interested reader, OTAF is now presenting a new publication series -- PATENT PROFILES. Each of these publications will deal with a specific technological area and will survey the patent activity of that area for a given period of time.

PATENT PROFILES provide many different kinds of information about a particular area of the patent file and assembles this information in a format which enables the user to extract the information needed or to collect necessary data to lead to the desired information.

Thus, interested users, both technically and non-technically oriented, from the public and private sectors, will be able to gain insight into what is being done in a technology, who is doing it, where it is being done and in what direction the technology is headed.

The objective of these publications is to use the U.S. patent file as a prime reference source in significantly adding to the universe of knowledge from which future inventors and innovators draw, and upon which corporate and public policy planners rely.

Synthetic Fuels

Escalating prices and widespread concern for the availability of foreign oil have brought this nation's interest in alternative energy sources to an all time high. The President's recent proposal for the development of domestic resources in sufficient amounts to replace 2.5 million barrels per day of imported petroleum by 1990 has naturally resulted in the focusing of a great deal of attention upon the previously untapped potential of synthetic fuels ("synfuels"). Such alternatives are especially attractive because the U.S. is rich in carbonaceous deposits from which synfuels are prepared, having about 29% of the world's total proved and currently recoverable coal, shale and tar sands.*

Technically speaking, synfuels is a term which has no precise definition. It refers for the most part, to fuels obtained from other than the usual sources, e.g., oil or methane produced from coal as opposed to well production of these fuels. This report examines levels and trends in patenting in those synfuel technologies dealing with the production of liquid hydrocarbons, gaseous hydrocarbons and synthesis gas (carbon monoxide and hydrogen) from any solid carbonaceous material except inorganic carbonates. Coal and oil shale are usually the carbonaceous materials employed, but other materials, such as bituminous sands, wood, and organic wastes, can also be used.

There are many different processes for preparing synfuels from carbonaceous materials. Broadly, these are characterized as In-Situ and In-Vitro processes, the major divisions used in this report. Passing treated coal through a pressurized fixed-bed gasifier (Lurgi process) is an example of the latter; in-ground retorting of shale, an example of the former. Each broad area is subdivided into a number of smaller component areas. Patenting for the period 1969-1978 is profiled in each component area.

---

*Chemical and Engineering News, August 27, 1979, page 24.

EXPLANATION OF DATA AND FORMAT

This report presents profiles of patenting* in ten major areas of synthetic fuel technology. Each of the profiles is divided into three parts:

PART 1

Part 1, the first page of each profile, identifies the area which is examined, lists the pertinent U.S. Patent Classification(s) involved, and graphically illustrates patent activity (across a designated 10-year span) in two ways: (1) by the patent grant date; (2) by the granted patents' application filing date. The latter method presents what is often considered a more useful measurement tool since application filing dates are closer in time to the actual development of the technology disclosed in the patent and are independent of PTO production variance.** Levels of involvement by foreign residents, corporations, and government agencies in recent U.S. patent activity, as well as a measure of relative growth in the particular technological area are presented in the "Activity Indices" (defined below).

(EXAMPLE)

I. B. IN SITU CONVERSION: WELLS

2. THERMAL EXPLOITATION BY METHODS OTHER ... FLUID INJECTION OR COMBUSTION

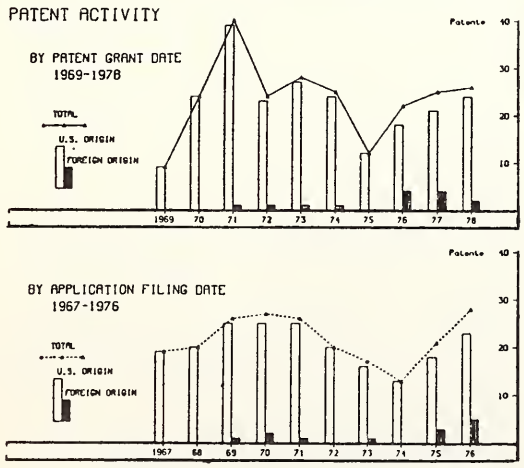
This profile includes in-the-earth conversion of solid carbonaceous material to liquid or gaseous hydrocarbons utilizing earth bores, including thermal exploitation or treatment by: passing an electric current or electromagnetic wave through the earth; sonic or ultrasonic vibration; nuclear energy; non-nuclear explosives or; using microorganisms.

INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 166, Subclasses 246-249, 299

ACTIVITY INDICES (1976-1978)

GROWTH	31.1%
FOREIGN SHARE	13.7%
CORPORATE OWNED	55.8%
GOVERNMENT OWNED	4.1%
U.S. OWNED OF FOREIGN	20.0%



TECHNOLOGY SCOPE

U.S. PATENT CLASSIFICATION

ACTIVITY INDICES - DEFINED

% GROWTH: The number of patents granted in the period 1976-78 divided by the total number of patents granted in the period 1969-78, multiplied by 100. (Average for all technologies = 28.4%)

% FOREIGN SHARE: The number of patents granted to residents of foreign countries in the years 1976-78, divided by total number of patents granted in these years, multiplied by 100. (Average for all technologies = 37.0%)

% CORPORATE OWNED: The number of 1976-78 patents assigned at time of grant to U.S. or foreign non-government entities -- mainly corporations -- divided by the total number of patents granted in this three year period, multiplied by 100. (Average for all technologies = 76.4%)

% GOVERNMENT OWNED: The number of 1976-78 patents assigned at time of grant to the U.S. Government or a foreign government, divided by total number of patents granted in this three year period, multiplied by 100. (Average for all technologies = 2.6%)

% U.S. OWNED OF FOREIGN: The number of 1976-78 patents with a foreign resident inventor assigned at the time of grant to a U.S. organization, divided by the number of patents with a foreign resident inventor in these years, multiplied by 100. (Average for all technologies = 8.5%)

The information on this page can be interpreted as indicative of trends in the direction and rate of growth of the subject technology.

---

* U.S. Patents only

**See further explanation in Appendix A.

PART 2A

Part 2A of each profile shows in tabular form the data relied upon in constructing the graphical illustrations in Part 1. The first table shows the yearly distribution of patents by the date of the patent grant, while the second table redistributes this data based on the application filing date of the patents. The usefulness of this latter data distribution is mentioned in the explanation of Part 1, and further detailed in Appendix A.

(EXAMPLE)

SYNTHETIC FUELS I B 3- IN SITU - WELLS - RECOVERY OF SOLIDS WITH LIQUID OR GASEOUS HYD

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATEN

	NUMBER OF PATENTED APPLIC									
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973
TOTAL	5	9	16	13	14	17	19	10	11	18
U.S. ORIGIN	4	8	14	10	13	12	15	10	10	17
FOREIGN ORIGIN	1	1	2	3	1	5	4		1	1
CANADA	1	1	2	2	1	3	1			1
NETHERLANDS						1	1			
GERMANY							1		1	
UNITED KINGDOM				1			1			
TURKEY						1				
BELGIUM										
U.S. ORIGIN	4	8	14	10	13	12	15	10	10	17
U.S. CORP. OWNED	4	6	13	6	9	10	13	10	10	12
U.S. GOVT. OWNED					2					1
U.S. INDIV. OWNED				3		2	1			4
FOREIGN OWNED		2	1	1	2		1			
FOREIGN ORIGIN	1	1	2	3	1	5	4		1	1
U.S. OWNED	1		1			2	3			
FOREIGN OWNED		1	1	3	1	3	1		1	1
FOREIGN CORP		1	1	2	1	3	1			1
FOREIGN GOVT										

PART 2B

Part 2B of each profile provides a list of assignees* ranked by the number of patents, in the technology, to which they held title at the time of the patent grant. In some instances, the listing is limited by designation of a "cut-off" (e.g., "2 or more patents"). The time period covered is 1969-1978. This list identifies those assignees, mostly corporations, which received the most patents in the technology encompassed by the profile during the subject time period, and shows the comparative relationship of their activity to that of the other participants in the field.

(EXAMPLE)

I.B. IN SITU CONVERSION - WELLS
1. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

TEXACO INC.	56
SHELL OIL COMPANY	44
PHILLIPS PETROLEUM COMPANY	37
OCCIDENTAL OIL SHALE, INC.	22
MOBIL OIL CORPORATION	16
IN SITU TECHNOLOGY, INC	16
EXXON PRODUCTION RESEARCH COMPANY	13
CONTINENTAL OIL COMPANY	12
CITIES SERVICE COMPANY	12
OCCIDENTAL PETROLEUM CORPORATION	10
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	9
PAN AMERICAN PETROLEUM CORPORATION	8
TEXACO EXPLORATION CANADA LTD.	8
MARATHON OIL COMPANY	8
DEUTSCHE TEXACO AKTIENGESELLSCHAFT	7
CHEVRON RESEARCH COMPANY	7
ATLANTIC RICHFIELD COMPANY	5
SUN OIL COMPANY OF PENNSYLVANIA	5

---

*See definition in Appendix A.

PART 2C

Part 2C of each profile also covers assigned patenting during the period 1969-1978. Assignees are listed alphabetically followed by a numerical listing of patents to which they held title at the time of patent grant.

This section provides valuable information to potential entrepreneurs, competitors and those in need of technological know-how by identifying corporate actors in the field. Inclusion of patent titles further defines the subject technology arena.

(EXAMPLE)

```
SYNTHETIC FUELS     I B 1-  IN SITU - WELLS - FLUID INJECTION OR COMBUSTI

                    ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AIRCO INC.
  3422892  -  SUPPLY OF HIGH-PRESSURE COMBUSTION- SUPPORTING GAS TO WELLS

AMERICAN OIL SHALE CORPORATION
  3465818  -  UNDERCUTTING OF NUCLEARLY DETONATED FORMATIONS BY SUBSEQUEN
              E RECOVERY OF VARIOUS MINERALS

AMOCO PRODUCTION COMPANY
  3964547  -  RECOVERY OF HEAVY HYDROCARBONS FROM UNDERGROUND FORMATIONS

ATLANTIC RICHFIELD COMPANY
  3586377  -  METHOD OF RETORTING OIL SHALE IN-SITU
  3603396  -  METHOD FOR INCREASING SUBTERRANEAN FORMATION PERMEABILITY
  3616856  -  METHOD OF PLUGGING A WATER-PRODUCING FORMATION
  3627044  -  METHOD OF PRODUCING TAR SANDS WITH LATERALLY CRATERED NUCLE
  3986557  -  PRODUCTION OF BITUMEN FROM TAR SANDS

AZS CORPORATION
  4063780  -  METHOD OF RECOVERING LIQUID AND GASEOUS PRODUCTS OF OIL SHA

BAISCH  J. CARROLL
  4007791  -  METHOD FOR RECOVERY OF CRUDE OIL FROM OIL WELLS

CARMEL ENERGY, INC.
```

PART 2D

Part 2D of each profile presents an alphabetical listing of inventors of unassigned patents (1975 to 1978) together with their addresses, the patent numbers and titles. This information facilitates identification of the apparently unaffiliated or "independent inventor" participants in the technology. Standard, two character codes are used to designate U.S. states and foreign countries. While the meaning of state codes should be obvious, the foreign country codes may not. Consequently, those appearing in the Part 2D listing are given in Appendix A.

(EXAMPLE)

```
SYNTHETIC FUELS     I B 1-  IN SITU - WELLS - FLUID INJECTION OR COMBUSTION                                  PAGE 0   1
                            UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)
  INVENTOR NAME                                STREET                      CITY                    ST    ZIP/CNTRY
  ALEXANDER          HARVEY          C.        610 W. 69TH ST.             ODESSA                  TX      79762
        4011906 - DOWNHOLE VALVE FOR PARAFFIN CONTROL
  ANTONOVA           ROZA            IVANOVNA  CHONGARSKY BULVAR, 10, KORPUS  MOSCOW                        SU
        3990514 - METHOD OF CONNECTION OF WELLS
        4083402 - METHOD OF UNDERGROUND GASIFICATION OF A COAL BED
```

At the end of Part 2D is a list of those patents (1963-1978) with neither assignment nor inventor information in the data base. Essentially, this encompasses all patenting in the period 1963-1968, and non-assigned ("independent inventor") patenting from 1969 through 1974. Titles are included for most patents granted subsequent to Jan. 1969.

```
                    PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

        3460867 - MINING AND RETORTING OF OIL SHALE
        3497335 - UNDERGROUND GASIFICATION OF COAL
        3506309 - METHOD AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL
        3529867 - PROCESS FOR THE COLLECTING OF THE PIT GAS FROM AN UNDERGROUND COAL MEASURE
        3159976   3205012   3236053   3254921   3316020   3362751
```

PART 3

Part 3 of each profile updates the preceding material by listing patent numbers, assignee or inventor, and title for those patents which issued from January to August, 1979.

A CAVEAT

The user of this publication should be aware that patent activity profiles are generated by first identifying key Patent and Trademark Office classifications, i.e., those entirely or substantially pertinent to the technology of interest. All the patents in these classifications are included in the profile. This procedure results, in most cases, with the inclusion of the majority of patents relevant to the technology and few non-relevant patents. However, in a collection as large and as varied as the patent file one can never be sure of the absolute completeness or "purity" of any subset. Consequently, the totality of patents covered in a profile should not be considered to be inclusive of all relevant patents, nor exclusive of all non-relevant patents.

I. A. IN SITU CONVERSION: MINES

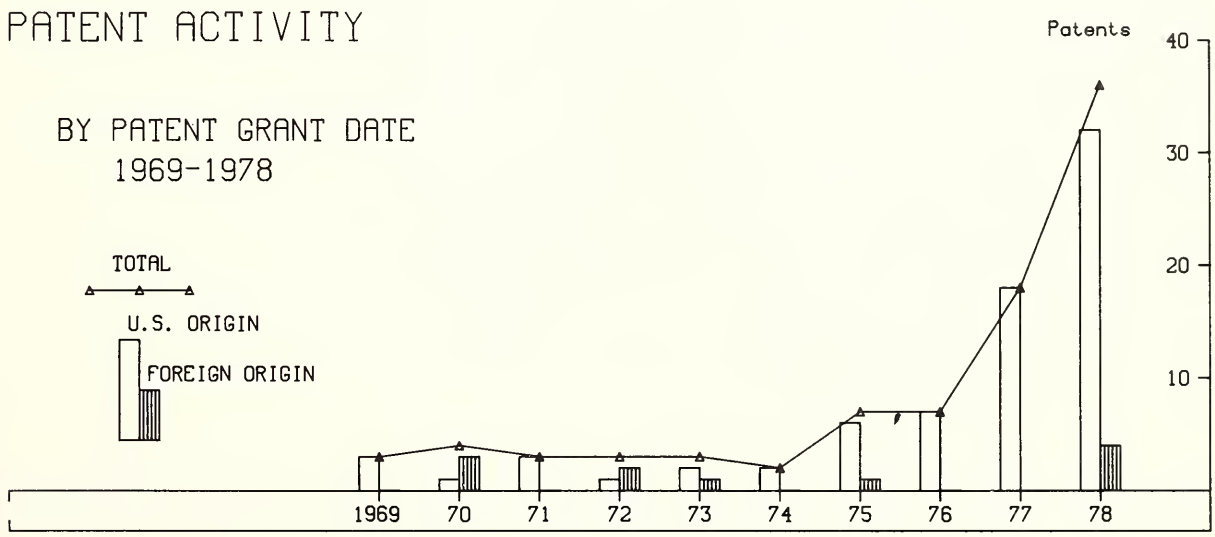
This profile includes in-the-earth conversion of solid carbonaceous material to liquid or gaseous hydrocarbons utilizing horizontal tunnels or chambers formed by mining processes.

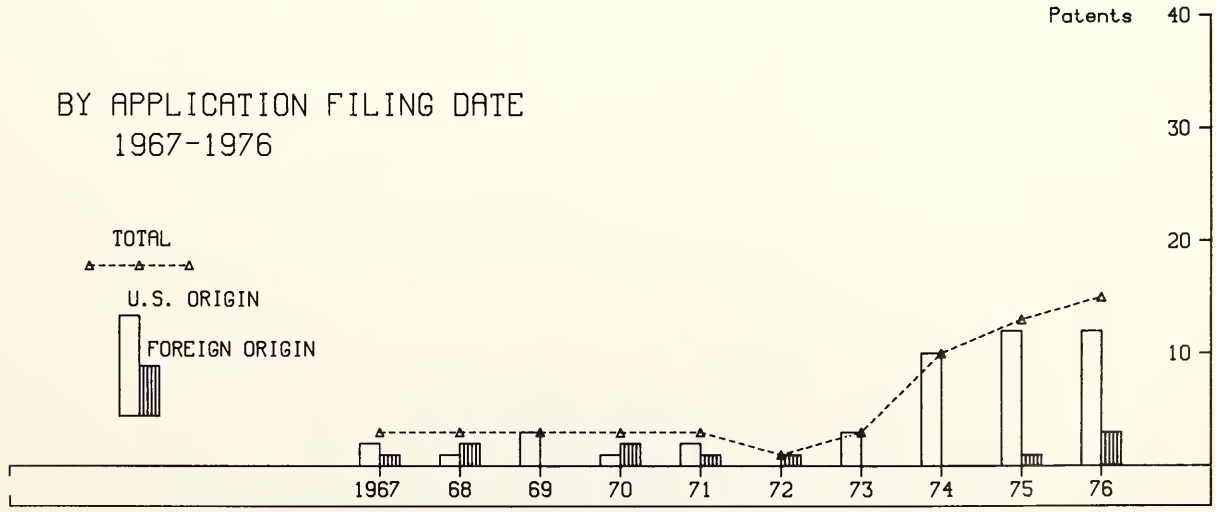
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 299, Subclass 2

ACTIVITY INDICES (1976-1978)

GROWTH	70.9%
FOREIGN SHARE	6.6%
CORPORATE OWNED	85.2%
GOVERNMENT OWNED	4.9%
U.S. OWNED OF FOREIGN	0.0%





SYNTHETIC FUELS 1 A - IN SITU - MINES

PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	1	1	2	1	1	3	4	3	3	3	2	7	7	18	36	92
U.S. ORIGIN	1	1	2	1	1	3	1	3	1	2	2	6	7	18	32	81
FOREIGN ORIGIN							3		2	1		1			4	11
GERMANY							1		1	1		1				4
CANADA															3	3
U.S.S.R.															1	1
BELGIUM							1									1
UNITED KINGDOM							1									1
JAPAN									1							1
U.S. ORIGIN	1	1	2	1	1	3	1	3	1	2	2	6	7	18	32	81
U.S. CORP. OWNED	1		1	1		2	1	3	1	2	2	5	6	16	30	71
U.S. GOVT. OWNED													1	1	1	3
U.S. INDIV. OWNED		1	1		1	1						1		1	1	7
FOREIGN OWNED																
FOREIGN ORIGIN							3		2	1		1			4	11
U.S. OWNED																
FOREIGN OWNED							3		2	1		1			4	11
FOREIGN CORP.									1	1						2
FOREIGN GOVT.																
FOREIGN INDIV.							3		1			1			4	9

SYNTHETIC FUELS 1 A - IN SITU - MINES

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	1	1	1	3	3	3	3	3	1	3	10	13	15	28		88
U.S. ORIGIN	1	1	1	2	1	3	1	2		3	10	12	12	28		77
FOREIGN ORIGIN				1	2		2	1	1			1	3			11
GERMANY					1		1	1	1							4
CANADA													3			3
U.S.S.R.												1				1
BELGIUM					1											1
UNITED KINGDOM				1												1
JAPAN							1									1
U.S. ORIGIN	1	1	1	2	1	3	1	2		3	10	12	12	28		77
U.S. CORP. OWNED	1			2	1	3	1	2		3	8	12	9	27		69
U.S. GOVT. OWNED											1		2			3
U.S. INDIV. OWNED		1	1								1		1	1		5
FOREIGN OWNED																
FOREIGN ORIGIN				1	2		2	1	1			1	3			11
U.S. OWNED																
FOREIGN OWNED				1	2		2	1	1			1	3			11
FOREIGN CORP.							1	1								2
FOREIGN GOVT.																
FOREIGN INDIV.				1	2		1		1			1	3			9

I.A. IN SITU CONVERSION - MINES

ASSIGNEES WITH 1 OR MORE PATENTS (1/69-12/78)

OCCIDENTAL OIL SHALE, INC.	26
OCCIDENTAL PETROLEUM CORPORATION	11
STANDARD OIL COMPANY (INDIANA)	4
CONTINENTAL OIL COMPANY	4
ATLANTIC RICHFIELD COMPANY	4
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	3
IN SITU TECHNOLOGY, INC.	3
WINTERSHALL AKTIENGESELLSHAFT	2
CITIES SERVICE COMPANY	2
MOBIL OIL CORPORATION	2
AZS CORPORATION	1
COPPER RANGE COMPANY	1
EXXON RESEARCH + ENGINEERING CO.	1
CONSOLIDATION COAL COMPANY	1
GEWERKSCHAFT EISENHUTTE WESTFALIA	1
GULF OIL COMPANY	1
GEOKINETICS, INC.	1
BECHTEL INTERNATIONAL CORP.	1
RAPIDEX, INC.	1
SHELL OIL COMPANY	1
ST. JOE MINERALS CORPORATION	1
NIPPON KOGEI KOGYO COMPANY, LIMITED	1
TECHNOLOGY APPLICATIONS SERVICES CORPORATION	1
GULF RESEARCH + DEVELOPMENT COMPANY	1

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

ATLANTIC RICHFIELD COMPANY
3586377 - METHOD OF RETORTING OIL SHALE IN-SITU
3917344 - IN SITU RETORTING SYSTEM
3917346 - METHOD OF BLASTING A SUBTERRANEAN DEPOSIT
3917348 - METHOD OF DEVELOPING PERMEABLE UNDERGROUND ZONES

AZS CORPORATION
4063780 - METHOD OF RECOVERING LIQUID AND GASEOUS PRODUCTS OF OIL SHALE

BECHTEL INTERNATIONAL CORP.
3934935 - HYDRAULIC MINING OF OIL BEARING FORMATION

CITIES SERVICE COMPANY
3628929 - METHOD FOR RECOVERY OF COAL ENERGY
3770398 - IN SITU COAL GASIFICATION PROCESS

CONSOLIDATION COAL COMPANY
3905430 - APPARATUS FOR RAISE DRILLING

CONTINENTAL OIL COMPANY
3437378 - RECOVERY OF OIL FROM SHALE
3765722 - METHOD FOR RECOVERING PETROLEUM PRODUCTS OR THE LIKE FROM SUBTERRANEAN MINERAL DEPOSITS
3814480 - METHOD OF CONTROLLING GAS ACCUMULATION IN UNDERGROUND MINES
4109719 - METHOD FOR CREATING A PERMEABLE FRAGMENTED ZONE WITHIN A SUBTERRANEAN CARBONACEOUS DEPOSIT FOR IN SITU COAL GASIFICATION

COPPER RANGE COMPANY
3853353 - METHOD OF EXTRACTING A METAL FROM A MATERIAL CONTAINING THE METAL IN ELEMENTAL FORM

EXXON RESEARCH + ENGINEERING CO.
3537753 - OIL SHALE MINING METHOD

GEOKINETICS, INC.
3980339 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS

GEWERKSCHAFT EISENHUTTE WESTFALIA
4099783 - METHOD FOR THERMOSHAFT OIL PRODUCTION

GULF OIL CORPORATION
4119349 - METHOD AND APPARATUS FOR RECOVERY OF FLUIDS PRODUCED IN IN-SITU RETORTING OF OIL SHALE

GULF RESEARCH + DEVELOPMENT COMPANY
4015664 - SHALE OIL RECOVERY PROCESS

IN SITU TECHNOLOGY, INC.
4092052 - CONVERTING UNDERGROUND COAL FIRES INTO COMMERCIAL PRODUCTS
4093310 - SEALING AN UNDERGROUND COAL DEPOSIT FOR IN SITU PRODUCTION
4102397 - SEALING AN UNDERGROUND COAL DEPOSIT FOR IN SITU PRODUCTION

MOBIL OIL CORPORATION
3950029 - IN SITU RETORTING OF OIL SHALE
4018280 - PROCESS FOR IN SITU RETORTING OF OIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

NIPPON KOGEI KOGYO COMPANY, LIMITED
3695001 - METHOD AND SYSTEM FOR REMOVING PARTICLES OF FLOATING DUSTS PRODUCED UPON AN EXCAVATION OF A TUNNEL

OCCIDENTAL OIL SHALE, INC.
4029360 - METHOD OF RECOVERING OIL AND WATER FROM IN SITU OIL SHALE RETORT FLUE GAS
4043595 - IN SITU RECOVERY OF SHALE OIL
4043596 - FORMING SHALE OIL RECOVERY RETORT BY BLASTING INTO SLOT-SHAPED COLUMNER VOID
4043597 - MULTIPLE LEVEL PREPARATION OF OIL SHALE RETORT
4043598 - MULTIPLE ZONE PREPARATION OF OIL SHALE RETORT
4045085 - FRACTURING OF PILLARS FOR ENHANCING RECOVERY OF OIL FROM IN SITU OIL SHALE RETORT
4047760 - IN SITU RECOVERY OF SHALE OIL
4072350 - MULTI-STAGE METHOD OF OPERATING AN IN SITU OIL SHALE RETORT
4076312 - METHOD AND APPARATUS FOR RETORTING OIL SHALE AT SUBATMOSPHERIC PRESSURE
4082145 - DETERMINING THE LOCUS OF A PROCESSING ZONE IN AN IN SITU OIL SHALE RETORT BY SOUND MONITORING
4082146 - LOW TEMPERATURE OXIDATION OF HYDROGEN SULFIDE IN THE PRESENCE OF OIL SHALE
4086962 - DECREASING HYDROGEN SULFIDE CONCENTRATION OF A GAS
4086963 - METHOD OF OXIDIZING HYDROGEN SULFIDE
4089375 - IN SITU RETORTING WITH WATER VAPORIZED IN SITU
4093026 - REMOVAL OF SULFUR DIOXIDE FROM PROCESS GAS USING TREATED OIL SHALE AND WATER
4105072 - PROCESS FOR RECOVERING CARBONACEOUS VALUES FROM POST IN SITU OIL SHALE RETORTING
4106814 - METHOD OF FORMING IN SITU OIL SHALE RETORTS
4109718 - METHOD OF BREAKING SHALE OIL-WATER EMULSION
4109964 - METHOD FOR PRECONDITIONING OIL SHALE PRELIMINARY TO EXPLOSIVE EXPANSION AND IN SITU RETORTING THEREOF
4118070 - SUBTERRANEAN IN SITU OIL SHALE RETORT AND METHOD FOR MAKING AND OPERATING SAME
4118071 - IN SITU OIL SHALE RETORT WITH A HORIZONTAL SILL PILLAR
4119345 - IN SITU OIL SHALE RETORTING PROCESS USING INTRODUCTION OF GAS AT AN INTERMEDIATE LOCATION
4120354 - DETERMINING THE LOCUS OF A PROCESSING ZONE IN AN IN SITU OIL SHALE RETORT BY PRESSURE MONITORING
4121663 - REMOVING HYDROGEN SULFIDE FROM A GAS
4125157 - REMOVING SULFUR DIOXIDE FROM GAS STREAMS WITH RETORTED OIL SHALE
4126180 - METHOD OF ENHANCING YIELD FROM AN IN SITU OIL SHALE RETORT

OCCIDENTAL PETROLEUM CORPORATION
3661423 - IN SITU PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS
3915498 - OIL SHALE RETORT FLUE GAS COOLING AND CLEANING
3941421 - APPARATUS FOR OBTAINING UNIFORM GAS FLOW THROUGH AN IN SITU OIL SHALE RETORT
3951456 - PROCESS FOR EFFECTING EVEN RETORT WORKING FLUID FLOW THROUGHOUT AN IN SITU RETORT CONTAINING CARBONACEOUS DEPOSITS
4005752 - METHOD OF IGNITING IN SITU OIL SHALE RETORT WITH FUEL RICH FLUE GAS
4007963 - OIL COLLECTION AND RECOVERY SYSTEM FOR IN SITU OIL SHALE RETORT
4014575 - SYSTEM FOR FUEL AND PRODUCTS OF OIL SHALE RETORT
4022511 - RECOVERY OF LIQUID AND GASEOUS PRODUCTS FROM AN IN SITU OIL SHALE RETORT
4025115 - METHOD OF ENHANCING RECOVERY OF OIL FROM PILLARS ADJACENT IN SITU OIL SHAFT RETORT
4027917 - METHOD FOR IGNITING THE TOP SURFACE OF OIL SHALE IN AN IN SITU RETORT
4087130 - PROCESS FOR THE GASIFICATION OF COAL IN SITU

RAPIDEX, INC.
3957305 - IN SITU VALUES EXTRACTION

SHELL OIL COMPANY
3434757 - SHALE OIL-PRODUCING PROCESS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

STANDARD OIL COMPANY (INDIANA)
4105251 - DISPERSION OF CATALYSTS WITH EXPLOSIVES FOR IN SITU MINING OF CARBONACEOUS MINERALS
4117886 - OIL SHALE RETORTING AND OFF-GAS PURIFICATION
4120355 - METHOD FOR PROVIDING FLUID COMMUNICATION FOR IN SITU SHALE RETORT
4131416 - SLURRY BACKFILLING OF IN SITU OIL SHALE RETORT

ST JOE MINERALS CORPORATION
3563606 - METHOD FOR IN-SITU UTILIZATION OF FUELS BY COMBUSTION

TECHNOLOGY APPLICATION SERVICES CORPORATION
4067390 - APPARATUS AND METHOD FOR THE RECOVERY OF FUEL PRODUCTS FROM SUBTERRANEAN DEPOSITS OF CARBONACEOUS MATTER USING A PLASMA ARC

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3933447 - UNDERGROUND GASIFICATION OF COAL
4017119 - METHOD FOR RUBBLIZING AN OIL SHALE DEPOSIT FOR IN SITU RETORTING
4069867 - CYCLIC FLOW UNDERGROUND COAL GASIFICATION PROCESS

WINTERSHALL AKTIENGESELLSCHAFT
3695711 - METHOD OF RECOVERING UNDERGROUND DEPOSITS OF SOLUBLE MINERALS, AND APPARATUS FOR CARRYING OUT THE METHOD
3744847 - APPARATUS FOR RECOVERING UNDERGROUND DEPOSITS OF SOLUBLE MINERALS

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BACIU	PETRU	C.	48-20 48TH ST.	WOODSIDE, QUEENS	NY	11377
3883177 - DIAMOND DRILL AND ROCK FRAGMENT EXCAVATION DEVICE						
FISHER	CHARLES	B.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
FISHER	SIDNEY	T.	2850 HILL PARK RD.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
GARRETT	DONALD	E.	505 W. 9TH ST.	CLAREMONT	CA	91711
4057293 - PROCESS FOR IN SITU CONVERSION OF COAL OR THE LIKE INTO OIL AND GAS						
JOHNS	ROBERT	W.	349 ASHLEY CRESCENT SE.	CALGARY, ALBERTA		CA
4076311 - HYDRAULIC MINING FROM TUNNEL BY RECIPROCATED PIPES						
KILBURN	JAMES	S.	3060 B-1/2 RD.	GRAND JUNCTION	CO	81501
4121662 - WATER PURIFICATION WITH FRAGMENTED OIL SHALE						
RABBITTS	LEONARD	C.	BIG CHIEF RD. R.R. #3	ORILLIA, ONTARIO		CA
4101172 - IN-SITU METHODS OF EXTRACTING BITUMEN VALUES FROM OIL-SAND DEPOSITS						
VON HIPPEL	HANS	JOACHIM	LATE OF P.O. OBERSTENWEILER	OBERSTENWEILER		DT
3865186 - METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL						
VON HIPPEL	MILA			OBERSTENWEILER		DT
3865186 - METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3460867 - MINING AND RETORTING OF OIL SHALE
3497335 - UNDERGROUND GASIFICATION OF COAL
3506309 - METHOD AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL
3529867 - PROCESS FOR THE COLLECTING OF THE PIT GAS FROM AN UNDERGROUND COAL MEASURE

I.A. IN SITU CONVERSION: MINES

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,133,380	Occidental Oil Shale, Inc.: Establishing A Combustion Zone Below A Sill Pillar In An In Situ Oil Shale Retort
4,133,580	Occidental Oil Shale, Inc.: Isolation Of In Situ Oil Shale Retorts
4,140,181	Occidental Oil Shale, Inc.: Two-Stage Removal Of Sulfur Dioxide From Process Gas Using Treated Oil Shale
4,140,343	Occidental Oil Shale, Inc.: Gas Withdrawal From An In Situ Oil Shale Retort
4,143,917	Continental Oil Company: In-Situ Retorting Of Oil Shale With In-Situ Formed Arches
4,146,272	Occidental Oil Shale, Inc.: Explosive Placement For Explosive Expansion Toward Spaced Apart Voids
4,147,388	Occidental Oil Shale, Inc.: Method For In Situ Recovery Of Liquid And Gaseous Products From Oil Shale Deposits
4,147,389	Occidental Oil Shale, Inc.: Method For Establishing A Combustion Zone In An In Situ Oil Shale Retort
4,148,358	Occidental Research Corporation: Oxidizing Hydrocarbons, Hydrogen, And Carbon Monoxide
4,148,529	Occidental Oil Shale, Inc.: Doping A Retort To Determine The Locus Of A Processing Zone
4,149,592	Occidental Oil Shale, Inc.: Containers For Indicators
4,149,595	Occidental Oil Shale, Inc.: In Situ Oil Shale Retort With Variations In Surface Area Corresponding To Kerogen Content Of Formation Within Retort Site
4,149,752	Occidental Oil Shale, Inc.: Operation Of An In Situ Oil Shale Retort
4,150,722	Occidental Oil Shale, Inc.: Determining The Locus Of A Retorting Zone In An Oil Shale Retort By Rate Of Shale Oil Production
4,151,877	Occidental Oil Shale, Inc.: Determining The Locus Of A Processing Zone In A Retort Through Channels

4,153,110 Occidental Oil Shale, Inc.: Ignition Of Fragmented Oil Shale Below A Sill Pillar In An In Situ Oil Shale Retort

4,153,297 Occidental Oil Shale, Inc.: Ground Water Control For An In Situ Oil Shale Retort

4,153,298 Occidental Oil Shale, Inc.: Removal Of Pillars From A Void For Explosive Expansion Toward The Void

4,153,299 Golder Associates, Inc.: Combustion Air Supply To In-Situ Retorts

4,153,300 Golder Associates, Inc.: Recovery Of Fluid Fuels By In-Situ Retorting Of Carbonaceous Deposits

4,156,461 Occidental Oil Shale, Inc.: Decreasing Hydrocarbon, Hydrogen And Carbon Monoxide Concentration Of A Gas

4,158,467 Gulf Oil Corporation: Process For Recovering Shale Oil

4,160,481 The HOP Corporation: Method For Recovering Subsurface Earth Substances

4,162,706 Occidental Oil Shale, Inc.: Determining The Locus Of A Processing Zone In An Oil Shale Retort By Monitoring Pressure Drop Across The Retort

4,162,808 Gulf Oil Corporation: In-Situ Retorting of Carbonaceous Deposits

4,163,475 Occidental Oil Shale, Inc.: Determining The Locus Of A Processsing Zone In An In Situ Oil Shale Retort

4,165,903 John H. Cobbs, 5021 S. Fulton St., Tulsa, OK 74135: Mine Enhanced Hydrocarbon Recovery Technique

I. B. IN SITU CONVERSION: WELLS

1. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

This profile includes in-the-earth conversion of solid carbonaceous material to liquid or gaseous hydrocarbons ultilizing earth bores, including thermal exploitation by combustion or injection of heated fluids, such as steam, hot water or hot hydrocarbon solvents.

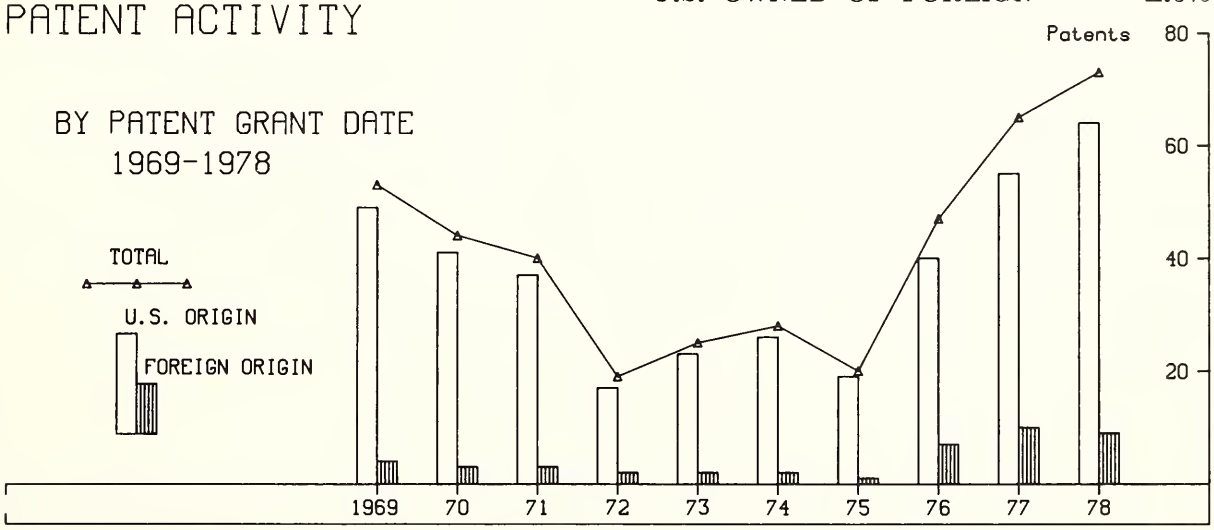
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

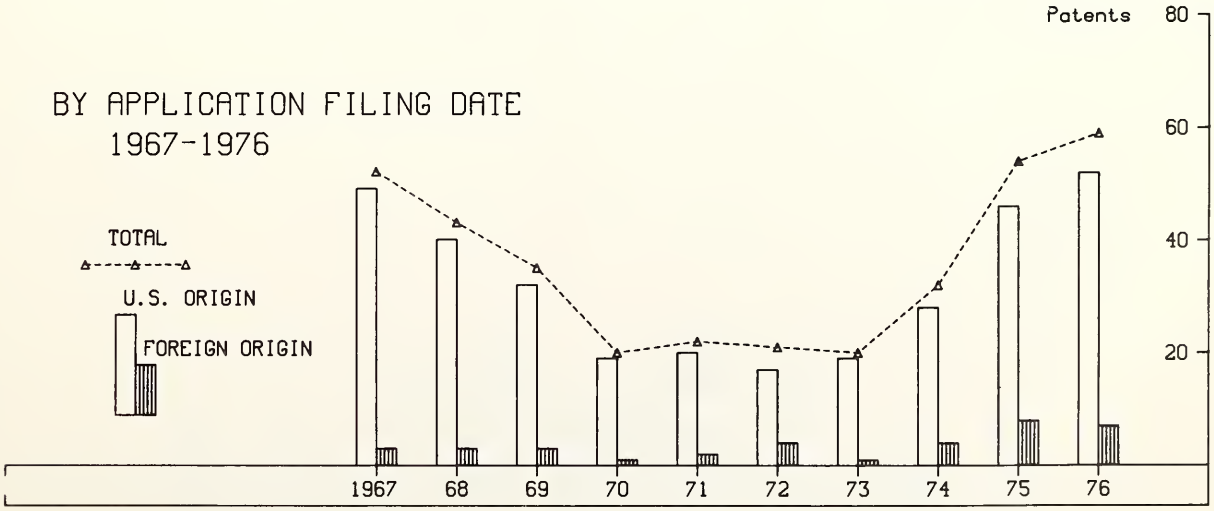
Class 48, Dig. 6
Class 166, Subclasses 256-262, 271, 272, 303

ACTIVITY INDICES (1976-1978)

GROWTH	44.7%
FOREIGN SHARE	14.0%
CORPORATE OWNED	77.3%
GOVERNMENT OWNED	4.9%
U.S. OWNED OF FOREIGN	11.5%

PATENT ACTIVITY





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	83	48	45	51	66	53	44	40	19	25	28	20	47	65	73	707
U.S. ORIGIN	82	47	41	45	61	49	41	37	17	23	26	19	40	55	64	647
FOREIGN ORIGIN	1	1	4	6	5	4	3	3	2	2	2	1	7	10	9	60
CANADA			1		2	2	1	1			2		5	4	8	26
GERMANY			2	3	1	2			1	2		1	1	3		16
NETHERLANDS	1		1	1					1					1		5
U.S.S.R.													1	2	1	4
VENEZUELA				1	2			1								4
FRANCE		1						1								2
IRAN				1												1
UNITED KINGDOM							1									1
TRINIDAD/TOBAGO							1									1
U.S. ORIGIN	82	47	41	45	61	49	41	37	17	23	26	19	40	55	64	647
U.S. CORP. OWNED	76	43	37	41	59	48	34	34	12	22	20	19	33	39	54	571
U.S. GOVT. OWNED											1		2	3	4	10
U.S. INDIV. OWNED	6	4	4	4	2	1	7	3	5	1	5		5	12	5	64
FOREIGN OWNED														1	1	2
FOREIGN ORIGIN	1	1	4	6	5	4	3	3	2	2	2	1	7	10	9	60
U.S. OWNED	1	1	2	3	4	2	1	3						1	2	20
FOREIGN OWNED			2	3	1	2	2		2	2	2	1	7	9	7	40
FOREIGN CORP.			2	3	1	2	1		1	2	1		4	5	3	25
FOREIGN GOVT.																
FOREIGN INDIV.							1		1		1	1	3	4	4	15

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	26	41	57	52	43	35	20	22	21	20	32	54	59	49		531
U.S. ORIGIN	25	35	52	49	40	32	19	20	17	19	28	46	52	43		477
FOREIGN ORIGIN	1	6	5	3	3	3	1	2	4	1	4	8	7	6		54
CANADA			3		2	1			2	1	3	4	3	6		25
GERMANY		3	1	2			1	1	2		1	1	2			14
NETHERLANDS		1						1					1			3
U.S.S.R.												3	1			4
VENEZUELA	1	1	1			1										4
FRANCE						1										1
IRAN		1														1
UNITED KINGDOM				1												1
TRINIDAD/TOBAGO					1											1
U.S. ORIGIN	25	35	52	49	40	32	19	20	17	19	28	46	52	43		477
U.S. CORP. OWNED	24	32	50	44	37	28	15	18	16	15	24	36	40	36		415
U.S. GOVT. OWNED									1		1	1	3	4		10
U.S. INDIV. OWNED	1	3	2	5	3	4	4	2		4	3	9	7	3		50
FOREIGN OWNED													2			2
FOREIGN ORIGIN	1	6	5	3	3	3	1	2	4	1	4	8	7	6		54
U.S. OWNED	1	3	4		2	3							1	2		16
FOREIGN OWNED		3	1	3	1		1	2	4	1	4	8	6	4		38
FOREIGN CORP.		3	1	2	1		1	1	2	1	4	2	2	3		23
FOREIGN GOVT.																
FOREIGN INDIV.				1				1	2			6	4	1		15

I.B. IN SITU CONVERSION - WELLS
1. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

TEXACO INC.	56
SHELL OIL COMPANY	44
PHILLIPS PETROLEUM COMPANY	37
OCCIDENTAL OIL SHALE, INC.	22
MOBIL OIL CORPORATION	16
IN SITU TECHNOLOGY, INC	16
EXXON PRODUCTION RESEARCH COMPANY	13
CONTINENTAL OIL COMPANY	12
CITIES SERVICE COMPANY	12
OCCIDENTAL PETROLEUM CORPORATION	10
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	9*
PAN AMERICAN PETROLEUM CORPORATION	8
TEXACO EXPLORATION CANADA LTD.	8
MARATHON OIL COMPANY	8
DEUTSCHE TEXACO AKTIENGESELLSCHAFT	7
CHEVRON RESEARCH COMPANY	7
ATLANTIC RICHFIELD COMPANY	5
SUN OIL COMPANY OF PENNSYLVANIA	5
TENNECO OIL COMPANY	5*
STANDARD OIL COMPANY (INDIANA)	4
WORLD ENERGY SYSTEMS	3
TRW INC.	3
DOW CHEMICAL COMPANY	3
GULF RESEARCH + DEVELOPMENT COMPANY	3
CARMEL ENERGY, INC.	2
HALLIBURTON COMPANY	2
DEUTSCHE ERDOL-AKTIENGESELLSCHAFT	2

*Composite total, see Appendix A.

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

AIRCO INC.
3422892 - SUPPLY OF HIGH-PRESSURE COMBUSTION- SUPPORTING GAS TO WELLS

AMERICAN OIL SHALE CORPORATION
3465818 - UNDERCUTTING OF NUCLEARLY OETONATED FORMATIONS BY SUBSEQUENT NUCLEAR DETONATIONS AT GREATER OEPTH AND USES THEREOF IN TH E RECOVERY OF VARIOUS MINERALS

AMOCO PRODUCTION COMPANY
3964547 - RECOVERY OF HEAVY HYOROCARBONS FROM UNOERGROUND FORMATIONS

ATLANTIC RICHFIELO COMPANY
3586377 - METHOO OF RETORTING OIL SHALE IN-SITU
3603396 - METHOO FOR INCREASING SUBTERRANEAN FORMATION PERMEABILITY
3616856 - METHOO OF PLUGGING A WATER-PRODUCING FORMATION
3627044 - METHOO OF PRODUCING TAR SANOS WITH LATERALLY CRATEREO NUCLEAR EXPLOSIONS
3986557 - PROOUCTION OF BITUMEN FROM TAR SANDS

AZS CORPORATION
4063780 - METHOO OF RECOVERING LIQUIO ANO GASEOUS PRODUCTS OF OIL SHALE

BAISCH J. CARROLL
4007791 - METHOO FOR RECOVERY OF CRUOE OIL FROM OIL WELLS

CARMEL ENERGY, INC.
3948323 - THERMAL INJECTION PROCESS FOR RECOVERY OF HEAVY VISCOUS PETROLEUM
3993135 - THERMAL PROCESS FOR RECOVERING VISCOUS PETROLEUM

CHEVRON RESEARCH COMPANY
3463231 - GENERATION ANO USE OF FOAMEO WELL CIRCULATION FLUIDS
3583488 - METHOD OF IMPROVING STEAM-ASSISTED OIL RECOVERY
3603389 - WELL LINER
3605890 - HYDROGEN PROOUCTION FROM A KEROGEN-DEPLETEO SHALE FORMATION
3721707 - ORGANIC SULFONIC ACIO OLIGOMERS AND PRODUCTION PROCESS
3892270 - PROOUCTION OF HYDROCARBONS FROM UNOERGROUND FORMATIONS
3994341 - RECOVERING VISCOUS PETROLEUM FROM THICK TAR SANO

CITIES SERVICE COMPANY
3601193 - IN SITU RETORTING OF OIL SHALE
3628929 - METHOO FOR RECOVERY OF COAL ENERGY
3672450 - METHOO FOR IN SITU COMBUSTION IGNITION
3692110 - IN SITU RETORTING AND HYOROGENATION OF OIL SHALE
3720263 - GAS WELL STIMULATION
3734180 - IN-SITU GASIFICATION OF COAL UTILIZING NON-HYPERSENSITIVE EXPLOSIVES
3734184 - METHOO OF IN SITU COAL GASIFICATION
3770398 - IN SITU COAL GASIFICATION PROCESS
3775073 - IN SITU GASIFICATION OF COAL BY GAS FRACTURING
3845196 - FIREFLOOO POLLUTION PREVENTION
3978920 - IN SITU COMBUSTION PROCESS FOR MULTI-STRATUM RESERVOIRS
3999606 - OIL RECOVERY RATE BY THROTTLING PRODUCTION WELLS DURING COMBUSTION DRIVE

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

CITIES SERVICE RESEARCH AND DEVELOPMENT COMPANY
3882941 - IN SITU PROOUCTION OF BITUMEN FROM OIL SHALE

CLARK, FORRESTER A.
3675715 - PROCESSES FOR SECONDARILY RECOVERING OIL

CONTINENTAL OIL COMPANY
3422891 - RAPIO BREAKTHROUGH IN SITU COMBUSTION PROCESS
3480081 - PRESSURE PULSING OIL PRODUCTION PROCESS
3480082 - IN SITU RETORTING OF OIL SHALE USING CO/2\ CARRIER
3511282 - PRESTRESSED CONOUIT FOR HEATED FLUIDS
3765722 - METHOO FOR RECOVERING PETROLEUM PRODUCTS OR THE LIKE FROM SUBTERRANEAN MINERAL OEPOSITS
3809159 - PROCESS FOR SIMULTANEOUSLY INCREASING RECOVERY ANO UPGRADING OIL IN A RESERVOIR
3823775 - METHOO FOR UPGRADING COAL GASIFICATION PROOUCTS
3856084 - BLEND BOREHOLE BACK-REAMING METHOO
3899026 - USE OF THERMAL INSULATING FLUIDS IN WELLS
4043395 - METHOD FOR REMOVING METHANE FROM COAL
4062405 - METHOO OF TREATING OIL-BEARING FORMATION USING MOLTEN SULFUR INSULATING
4109719 - METHOD FOR CREATING A PERMEABLE FRAGMENTED ZONE WITHIN A SUBTERRANEAN CARBONACEOUS OEPOSIT FOR IN SITU COAL GASIFICATION

OEUTSCHE EROOL-AKTIENGESELLSCHAFT
3456730 - PROCESS ANO APPARATUS FOR THE PROOUCTION OF BITUMENS FROM UNOERGROUNO DEPOSITS HAVING VERTICAL BURNING FRONT
3473610 - PROCESS FOR OBTAINING BITUMENS FROM UNOERGROUND OEPOSITS

DEUTSCHE TEXACO AKTIENGESELLSCHAFT
3700035 - METHOD FOR CONTROLLABLE IN-SITU COMBUSTION
3772881 - APPARATUS FOR CONTROLLABLE IN-SITU COMBUSTION
3777816 - METHOO FOR THE IGNITION OF IN-SITU COMBUSTION FOR THE RECOVERY OF PETROLEUM
3941191 - METHOO OF CONSOLIDATING UNCONSOLIOATEO OR INSUFFICIENTLY CONSOLIDATED FORMATIONS
4014721 - IGNITION MIXTURE FOR INITIATING UNOERGROUND IN-SITU COMBUSTION
4042026 - METHOO FOR INITIATING AN IN-SITU RECOVERY PROCESS BY THE INTROOUCTION OF OXYGEN
4057107 - METHOD OF INITIATING UNOERGROUNO IN-SITU COMBUSTION

DOW CHEMICAL COMPANY
3606465 - METHOD OF RECOVERING MINERAL VALVES FROM AN UNOERGROUNO FORMATION
3734188 - WELL CEMENTING ANO STIMULATION METHOO
4022277 - IN SITU SOLVENT FRACTIONATION OF BITUMENS CONTAINED IN TAR SANOS

ELECTROFLOOO COMPANY
4037655 - METHOO FOR SECONOARY RECOVERY OF OIL

ELECTROTHERMIC CO.
3614986 - METHOO FOR INJECTING HEATED FLUIDS INTO MINERAL BEARING FORMATION

ESORCO CORPORATION
3964545 - PROCESSES FOR SECONOARILY RECOVERING OIL

EXXON PROOUCTION RESEARCH COMPANY
3525399 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM
3559738 - TECHNIQUE FOR STEAM INJECTION
3664424 - METHOD FOR INSULATING A WELL
3664425 - WELL INSULATION METHOD
3714985 - STEAM OIL RECOVERY PROCESS

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

EXXON PRODUCTION RESEARCH COMPANY (CONTINUEO)
3739852 - THERMAL PROCESS FOR RECOVERING OIL
3782470 - THERMAL OIL RECOVERY TECHNIQUE
3861469 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM
3946809 - OIL RECOVERY BY COMBINATION STEAM STIMULATION AND ELECTRICAL HEATING
4024919 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM
4085803 - METHOO FOR OIL RECOVERY USING A HORIZONTAL WELL WITH INOIRECT HEATING
4091869 - IN SITU PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS
4116275 - RECOVERY OF HYDROCARBONS BY IN SITU THERMAL EXTRACTION

EXXON RESEARCH + ENGINEERING CO.
3999607 - RECOVERY OF HYDROCARBONS FROM COAL

GCOE CORPORATION
3980137 - STEAM INJECTOR APPARATUS FOR WELLS

GEOKINETICS, INC.
3980339 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS

GETTY OIL COMPANY
3924683 - METHOD FOR ENHANCING THE RECOVERY OF OIL USING STEAM STIMULATION PROCESS

GULF RESEARCH + OEVELOPMENT COMPANY
3422893 - CONDUCTION HEATING OF FORMATIONS
3465826 - HIGH-TEMPERATURE
4015664 - SHALE OIL RECOVERY PROCESS

HALLIBURTON COMPANY
3502148 - METHOD OF IMPROVING BOND STRENGTH
3842906 - WELL BORE CLEANER CONSTRUCTION

IN SITU TECHNOLOGY, INC.
3924680 - METHOD OF PYROLYSIS OF COAL IN SITU
3948320 - METHOO OF IN SITU GASIFICATION, COOLING AND LIQUEFACTION OF A SUBSURFACE COAL FORMATION
3952802 - METHOD AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE COMMERCIAL PRODUCTS OERIVED THEREFROM
4010800 - PROOUCING THIN SEAMS OF COAL IN SITU
4018481 - GASIFICATION OF COAL IN SITU
4031956 - METHOO OF RECOVERING ENERGY FROM SUBSURFACE PETROLEUM RESERVOIRS
4059151 - METHODS OF FLUIDIZEO PRODUCTION OF COAL IN SITU
4069868 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU
4089372 - METHOOS OF FLUIDIZED PRODUCTION OF COAL IN SITU
4089374 - PROOUCING METHANE FROM COAL IN SITU
4092052 - CONVERTING UNOERGROUNO COAL FIRES INTO COMMERCIAL PRODUCTS
4093025 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU
4099567 - GENERATING MEOIUM BTU GAS FROM COAL IN SITU
4102397 - SEALING AN UNDERGROUNO COAL OEPOSIT FOR IN SITU PROOUCTION
4113313 - RECOVERING URANIUM FROM COAL IN SITU
4114688 - MINIMIZING ENVIRONMENTAL EFFECTS IN PROOUCTION ANO USE OF COAL

INTERNATIONAL SALT COMPANY
3858397 - CARRYING OUT HEAT-PROMOTABLE CHEMICAL REACTIONS IN SOOIUM CHLORIDE FORMATION CAVERN

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

JUSTHEIM PETROLEUM COMPANY
3766982 - METHOD FOR THE IN-SITU TREATMENT OF HYDROCARBONACEOUS MATERIALS

KOPPERS COMPANY INC.
3990513 - METHOD OF SOLUTION MINING OF COAL

MARATHON OIL COMPANY
3470955 - LOW API GRAVITY CRUDE OIL RECOVERY PROCESS BY IN SITU COMBUSTION
3482630 - IN SITU STEAM GENERATION AND COMBUSTION RECOVERY
3498381 - METHOD FOR INJECTION OF HOT FLUIDS INTO AN UNDERGROUND FORMATION
3604508 - USE OF OIL-EXTERNAL MICELLAR DISPERSIONS AS PLUGGING AGENTS IN SUBTERRANEAN FORMATIONS
3620302 - SEALING PERMEABLE ZONES IN SUBTERRANEAN FORMATIONS WITH HEAT SENSITIVE SOLUTIONS
3730270 - SHALE OIL RECOVERY FROM FRACTURED OIL SHALE
3929193 - RECOVERY OF ORGANIC MATTER FROM ORGANIC MINERAL-CONTAINING DEPOSITS
4084640 - COMBINED COMBUSTION FOR IN-SITU RETORTING OF OIL SHALES

MCDONNELL DOUGLAS CORPORATION
3596993 - METHOD OF EXTRACTING OIL AND BY-PRODUCTS FROM OIL SHALE

MOBIL OIL CORPORATION
3421583 - RECOVERING OIL BY CYCLIC STEAM INJECTION COMBINED WITH HOT WATER DRIVE
3430696 - SHUT-OFF CONTROL FOR AN IN-SITU COMBUSTION PRODUCTION WELL
3434541 - IN SITU COMBUSTION PROCESS
3454095 - OIL RECOVERY METHOD USING STEAM STIMULATION OF SUBTERRANEAN FORMATION
3467189 - METHOD FOR DETERMINING THE APPROACH OF A COMBUSTION FRONT ADJACENT A PRODUCTION WELL
3468376 - THERMAL CONVERSION OF OIL SHALE INTO RECOVERABLE HYDROCARBONS
3542131 - METHOD OF RECOVERING HYDROCARBONS FROM OIL SHALE
3620301 - METHOD OF IN
3637013 - IN-SITU COMBUSTION PROCESS USING TIME-DEPENDENT SHEAR-THINNING LIQUID BARRIER
3710863 - TREATMENT OF FORMATIONS CONTAINING FRESH-WATER SWELLING CLAYS
3794113 - COMBINATION IN SITU COMBUSTION DISPLACEMENT AND STEAM STIMULATION OF PRODUCING WELLS
3823776 - OIL RECOVERY METHOD BY OXIDATION AND FORMING SURFACTANTS IN SITU
3880237 - PREVENTION OF SCALE IN PETROLEUM PRODUCTION BY ALKALINE FLOODS
3950029 - IN SITU RETORTING OF OIL SHALE
4015663 - METHOD OF SUBTERRANEAN STEAM GENERATION BY IN SITU COMBUSTION OF COAL
4019577 - THERMAL ENERGY PRODUCTION BY IN SITU COMBUSTION OF COAL

MOTCO, INC.
3833059 - HOT GAS APPARATUS FOR RECOVERY OF OIL VALUES

NEW MEXICO TECH RESEARCH FOUNDATION
3973628 - IN SITU SOLUTION MINING OF COAL

OCCIDENTAL OIL SHALE, INC.
4029360 - METHOD OF RECOVERING OIL AND WATER FROM IN SITU OIL SHALE RETORT FLUE GAS
4036299 - ENRICHING OFF GAS FROM OIL SHALE RETORT
4043595 - IN SITU RECOVERY OF SHALE OIL
4043597 - MULTIPLE LEVEL PREPARATION OF OIL SHALE RETORT
4043598 - MULTIPLE ZONE PREPARATION OF OIL SHALE RETORT
4047760 - IN SITU RECOVERY OF SHALE OIL
4072350 - MULTI-STAGE METHOD OF OPERATING AN IN SITU OIL SHALE RETORT
4076312 - METHOD AND APPARATUS FOR RETORTING OIL SHALE AT SUBATMOSPHERIC PRESSURE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

OCCIDENTAL OIL SHALE, INC. (CONTINUED)

4082146 - LOW TEMPERATURE OXIDATION OF HYDROGEN SULFIDE IN THE PRESENCE OF OIL SHALE
4086962 - DECREASING HYDROGEN SULFIDE CONCENTRATION OF A GAS
4086963 - METHOD OF OXIDIZING HYDROGEN SULFIDE
4089375 - IN SITU RETORTING WITH WATER VAPORIZED IN SITU
4093026 - REMOVAL OF SULFUR DIOXIDE FROM PROCESS GAS USING TREATED OIL SHALE AND WATER
4105072 - PROCESS FOR RECOVERING CARBONACEOUS VALUES FROM POST IN SITU OIL SHALE RETORTING
4109718 - METHOD OF BREAKING SHALE OIL-WATER EMULSION
4109964 - METHOD FOR PRECONDITIONING OIL SHALE PRELIMINARY TO EXPLOSIVE EXPANSION AND IN SITU RETORTING THEREOF
4118070 - SUBTERRANEAN IN SITU OIL SHALE RETORT AND METHOD FOR MAKING AND OPERATING SAME
4118071 - IN SITU OIL SHALE RETORT WITH A HORIZONTAL SILL PILLAR
4119345 - IN SITU OIL SHALE RETORTING PROCESS USING INTRODUCTION OF GAS AT AN INTERMEDIATE LOCATION
4121663 - REMOVING HYDROGEN SULFIDE FROM A GAS
4125157 - REMOVING SULFUR DIOXIDE FROM GAS STREAMS WITH RETORTED OIL SHALE
4126180 - METHOD OF ENHANCING YIELD FROM AN IN SITU OIL SHALE RETORT

OCCIDENTAL PETROLEUM CORPORATION

3915498 - OIL SHALE RETORT FLUE GAS COOLING AND CLEANING
3951456 - PROCESS FOR EFFECTING EVEN RETORT WORKING FLUID FLOW THROUGHOUT AN IN SITU RETORT CONTAINING CARBONACEOUS DEPOSITS
3952801 - METHOD FOR IGNITING OIL SHALE RETORT
3994343 - PROCESS FOR IN SITU OIL SHALE RETORTING WITH OFF GAS RECYCLING
4005752 - METHOD OF IGNITING IN SITU OIL SHALE RETORT WITH FUEL RICH FLUE GAS
4007963 - OIL COLLECTION AND RECOVERY SYSTEM FOR IN SITU OIL SHALE RETORT
4014575 - SYSTEM FOR FUEL AND PRODUCTS OF OIL SHALE RETORT
4022511 - RECOVERY OF LIQUID AND GASEOUS PRODUCTS FROM AN IN SITU OIL SHALE RETORT
4027917 - METHOD FOR IGNITING THE TOP SURFACE OF OIL SHALE IN AN IN SITU RETORT
4087130 - PROCESS FOR THE GASIFICATION OF COAL IN SITU

OTISCA INDUSTRIES LTD.

4027731 - METHODS OF AND APPARATUS FOR HYDROCARBON RECOVERY

PAN AMERICAN PETROLEUM CORPORATION

3430700 - RECOVERY OF PETROLEUM BY THERMAL METHODS INVOLVING TRANSFER OF HEAT FROM ONE SECTION OF AN OIL-BEARING FORMATION TO ANOT HER
3434544 - METHOD FOR CONDUCTING CYCLIC STEAM INJECTION IN RECOVERY OF HYDROCARBONS
3460621 - CYCLIC STEAM INJECTION AND GAS DRIVE
3464491 - OIL RECOVERY FROM FORMATIONS CONTAINING CHANNELS
3481399 - RECOVERY OF OIL BY FLASHING OF HEATED CONNATE WATER
3504745 - USE OF SANDS DURING IN-SITU COMBUSTION
3547195 - PYROLYTIC PLUGGING OF OIL-BEARING FORMATIONS BY UNDERGROUND COMBUSTION
3566967 - THERMAL PLUGGING WITH SILICATE SOLUTIONS

PARSONS, RALPH M., COMPANY

3881550 - IN SITU RECOVERY OF HYDROCARBONS FROM TAR SANDS

PETRO-CANADA EXPLORATION INC.

4084637 - METHOD OF PRODUCING VISCOUS MATERIALS FROM SUBTERRANEAN FORMATIONS

PETROFINA CANADA LTD.

3825066 - PROCESS FOR DEVELOPING INTERWELL COMMUNICATION IN A TAR SAND

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PETROLITE CORPORATION
3782472 - STEAM INJECTION OF OIL FORMATIONS

PHILLIPS PETROLEUM COMPANY
3420298 - AVOIDING CASING DAMAGE DURING DIRECT STEAM DRIVE OIL PRODUCTION
3451479 - INSULATING A CASING AND TUBING STRING IN AN OIL WELL FOR A HOT FLUID DRIVE
3454958 - PRODUCING OIL FROM NUCLEAR-PRODUCED CHIMNEYS IN OIL SHALE
3455384 - METHOD OF CONTROLLING STEAM INJECTION INTO A RESERVOIR IN THE PRODUCTION OF HYDROCARBONS
3456731 - IN-SITU PRODUCTION OF OIL FROM STRATA OF LOW PERMEABILITY
3456734 - PROTECTION OF WELL CASING FROM THERMAL OVERSTRESSING
3457995 - IGNITING AN UNDERGROUND FORMATION
3457996 - THERMAL OIL RECOVERY PROCESS UTILIZING DECOMPOSITION OF CO
3460620 - RECOVERING OIL FROM NUCLEAR CHIMNEYS IN OIL-YIELDING SOLIDS
3465822 - THERMAL OIL STIMULATION PROCESS
3490529 - PRODUCTION OF OIL FROM A NUCLEAR CHIMNEY IN AN OIL SHALE BY IN SITU COMBUSTION
3490530 - INITIATING IN AUTOIGNITIBLE COMPOSITION
3490531 - THERMAL OIL STIMULATION PROCESS
3499489 - PRODUCING OIL FROM NUCLEAR-PRODUCED CHIMNEYS IN OIL SHALE
3499490 - METHOD FOR PRODUCING OXYGENATED PRODUCTS FROM OIL SHALE
3521709 - PRODUCING OIL FROM OIL SHALE BY HEATING WITH HOT GASES
3533472 - PROTECTING THE CASING OF A HOT FLUID INJECTION WELL WITH VAPORIZABLE LIQUID
3545544 - RECOVERY OF HYDROCARBONS BY IN SITU COMBUSTION
3548938 - IN SITU METHOD OF PRODUCING OIL FROM OIL SHALE
3550685 - SHALE OIL PRODUCTION
3554285 - PRODUCTION AND UPGRADING OF HEAVY VISCOUS OILS
3565174 - METHOD OF IN SITU COMBUSTION WITH INTERMITTENT INJECTION OF VOLATILE LIQUID
3580336 - PRODUCTION OF OIL FROM A PUMPING WELL AND A FLOWING WELL
3581822 - METHOD OF PREVENTING CASING AND/OR TUBING DAMAGE IN STEAM INJECTION WELL
3583484 - PROCESS FOR IGNITING HYDROCARBON MATERIALS WITHIN A SUBTERRANEAN FORMATION
3587738 - IN SITU COMBUSTION PRODUCTION METHOD
3587739 - METHOD OF REMOVING PERMEABILITY BLOCKS
3604507 - SINGLE WELL BACKFLOW IN SITU COMBUSTION PROCESS
3608637 - IN SITU COMBUSTION PRODUCTION METHOD
3618663 - SHALE OIL PRODUCTION
3680634 - AIDING AUTO-IGNITION IN TAR SAND FORMATION
3782467 - METHOD FOR REDUCING GAS PRODUCTION
3872924 - GAS CAP STIMULATION FOR OIL RECOVERY
3994345 - METHOD OF RECOVERING OIL USING STEAM
4072191 - FIRE FLOOR PROCESS
4085800 - PLUGGING EARTH STRATA
4113017 - HOT EFFLUENT FROM PARTIAL OXIDATION OF NATURAL GAS INJECTED IN OIL RECOVERY PROCESS

RADON DEVELOPMENT CORPORATION
3837402 - PROCESS FOR REMOVING OIL FROM AROUND A WELLBORE

SENNECO OIL COMPANY
3602310 - METHOD OF INCREASING THE PERMEABILITY OF A SUBTERRANEAN HYDROCARBON BEARING FORMATION

SHELL CANADA LIMITED
4064942 - AQUIFER-PLUGGING STEAM SOAK FOR LAYERED RESERVOIR

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

SHELL OIL COMPANY
3422890 - TREATMENT OF SUBSURFACE OIL-BEARING FORMATIONS WITH OIL-WETTING CATIONIC EMULSIONS
3424249 - CLEANING STEAM INJECTION WELL TUBING STRING IN SITU
3438442 - LOW-TEMPERATURE PACKER
3438443 - SILICA-DISSOLUTION PREVENTION IN OIL RECOVERY
3439742 - METHOD OF PRODUCING HYDROCARBONS FROM AN UNDERGROUNO FORMATION
3448807 - PROCESS FOR THE THERMAL RECOVERY OF HYOROCARBONS FROM AN UNDERGROUND FORMATION
3455391 - PROCESS FOR HORIZONTALLY FRACTURING SUBTERRANEAN EARTH FORMATIONS
3455392 - THERMOAUGMENTATION OF OIL PRODUCTION SUBTERRANEAN RESERVOIRS
3474862 - REVERSE COMBUSTION METHOO OF RECOVERING OIL FROM STEEPLY DIPPING RESERVOIR INTERVAL
3478825 - METHOO OF INCREASING THE VOLUME OF A PERMEABLE ZONE WITHIN AN OIL SHALE FORMATION
3481398 - PERMEABILIZING BY ACIOIZING OIL SHALE TUFFACEOUS STREAKS IN AND OIL RECOVERY THEREFROM
3500913 - METHOO OF RECOVERING LIQUEFIABLE COMPONENTS FROM A SUBTERRANEAN EARTH FORMATION
3501201 - METHOO OF PROOUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION
3502372 - PROCESS OF OIL
3513913 - OIL RECOVERY FROM OIL SHALES BY TRANSVERSE COMBUSTION
3513914 - METHOO FOR PROOUCING SHALE OIL FROM AN OIL SHALE FORMATION
3515213 - SHALE OIL RECOVERY PROCESS USING HEATEO OIL- MISCIBLE FLUIOS
3527303 - THERMAL SECONOARY RECOVERY
3537528 - METHOO FOR PROOUCING SHALE OIL FROM AN EXFOLIATED OIL SHALE FORMATION
3537529 - METHOO OF INTERCONNECTING A PAIR OF WELLS EXTENDING INTO A SUBTERRANEAN OIL SHALE FORMATION
3563312 - METHOO OF RECOVERING HYOROCARBONS FROM AN UNDERGROUND HYDROCARBON CONTAINING FORMATION
3565171 - METHOO FOR PROOUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION
3572838 - RECOVERY OF ALUMINUM COMPOUNOS AND OIL FROM OIL SHALE FORMATIONS
3578080 - METHOO OF PROOUCING SHALE OIL FROM AN OIL SHALE FORMATION
3593789 - METHOO FOR PROOUCING SHALE OIL FROM AN OIL SHALE FORMATION
3593790 - METHOO FOR PROOUCING SHALE OIL FROM AN OIL SHALE FORMATION
3650327 - THERMAL INSULATION OF WELLS
3669188 - HEAT-GUIOEO HYDROXIDE PLUGGING
3682244 - CONTROL OF A STEAM ZONE
3682246 - FRACTURING TO INTERCONNECT WELLS
3695354 - HALOGENATING EXTRACTION OF OIL FROM OIL SHALE
3700280 - METHOO OF PRODUCING OIL FROM AN OIL SHALF FORMATION CONTAINING NAHCOLITE AND DAWSONITE
3707193 - GAS-STRENGTHENEO STEAM FOAM WELL CLEANING
3727686 - OIL RECOVERY BY OVERLYING COMBUSTION ANO HOT WATER DRIVES
3759328 - LATERALLY EXPANOING OIL SHALE PERMEABILIZATION
3779602 - PROCESS FOR SOLUTION MINING NAHCOLITE
3804172 - METHOO FOR THE RECOVERY OF OIL FROM OIL SHALE
3880238 - SOLVENT/NON-SOLVENT PYROLYSIS OF SUBTERRANEAN OIL SHALE
3894769 - RECOVERING OIL FROM A SUBTERRANEAN CARBONACEOUS FORMATION
3945679 - SUBTERRANEAN OIL SHALE PYROLYSIS WITH PERMEATING AND CONSOLIDATING STEPS
3977469 - CONSERVATION OF WATER FOR CORE FLOW
3987851 - SERIALLY BURNING ANO PYROLYZING TO PROOUCE SHALE OIL FROM A SUBTERRANEAN OIL SHALE
4026360 - HYOROTHERMALLY FORMING A FLOW BARRIER IN A LEACHED SUBTERRANEAN OIL SHALE FORMATION
4040483 - RECOVERY OF OIL BY CIRCULATING HOT FLUIO THROUGH A GAS-FILLED PORTION OF A NETWORK INTERCONNECTED FRACTURES

SHUFFMAN, EXECUTRIX ROSE
4010803 - METHOO FOR CRYOTHERMAL FRACTURING OF ROCK FORMATIONS

SHUFFMAN, OSCAR
3759329 - CRYO-THERMAL PROCESS FOR FRACTURING ROCK FORMATIONS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SINCLAIR RESEARCH INC.
3420300 - METHOD AND APPARATUS FOR HEATING A SUBSURFACE FORMATION

STANDARD OIL COMPANY (INOIANA)
4074757 - METHOD USING LIGNOSULFONATES FOR HIGH-TEMPERATURE PLUGGING
4105251 - OISPERSION OF CATALYSTS WITH EXPLOSIVES FOR IN SITU MINING OF CARBONACEOUS MINERALS
4117886 - OIL SHALE RETORTING AND OFF-GAS PURIFICATION
4120355 - METHOO FOR PROVIOING FLUIO COMMUNICATION FOR IN SITU SHALE RETORT

STANOARO OIL COMPANY
3948755 - PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM OIL SHALE AND TAR SANDS

ST. JOE MINERALS CORPORATION
3563606 - METHOD FOR IN-SITU UTILIZATION OF FUELS BY COMBUSTION

SUN OIL COMPANY OF PENNSYLVANIA
3452816 - IN SITU COMBUSTION METHOD
3680633 - SITU COMBUSTION INITIATION PROCESS
3712375 - METHOO FOR CATALYTICALLY HEATING WELLBORES
3812913 - METHOO OF FORMATION CONSOLIOATION
3905553 - MIST INJECTION METHOD ANO SYSTEM

SYRACUSE UNIVERSITY RESEARCH CORPORATION
4130164 - PROCESS FOR COAL GASIFICATION

T. D. WILLIAMSON, INC.
3576043 - PIPELINE PIG WITH SPRING-MOUNTEO SCRAPERS

TECHNOLOGY APPLICATION SERVICES CORPORATION
4067390 - APPARATUS AND METHOO FOR THE RECOVERY OF FUEL PRODUCTS FROM SUBTERRANEAN OEPOSITS OF CARBONACEOUS MATTER USING A PLASMA ARC

TENNECO OIL COMPANY
3441083 - METHOO OF SUBTERRANEAN FORMATION
3500915 - METHOD OF PROOUCING AN OIL BEARING STRATUM OF A SUBTERRANEAN FORMATION IN A STEEPLY DIPPING RESERVOIR
3500931 - METHOO FOR HEATING AN OIL RESERVOIR BY INJECTING ALTERNATE SLUGE OF STEAM AND HIGHER SPECIFIC HEAT MATERIAL
3524502 - STEAM INJECTION METHOD FOR PRODUCING OIL

TERRY; R. C.
4010801 - METHOO OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT

TEXACO EXPLORATION CANAOA LTO.
3951457 - HYORAULIC MINING TECHNIQUE FOR RECOVERING BITUMEN FROM TAR SANO OEPOSIT
3978925 - METHOD FOR RECOVERY OF BITUMENS FROM TAR SANOS
3993132 - THERMAL RECOVERY OF HYOROCARBONS FROM TAR SANDS
4006778 - THERMAL RECOVERY OF HYDROCARBON FROM TAR SANOS
4026357 - IN SITU GASIFICATION OF SOLID HYDROCARBON MATERIALS IN A SUBTERRANEAN FORMATION
4099566 - VICOUS OIL RECOVERY METHOD
4114690 - LOW-TEMPERATURE OXIOATION METHOO FOR THE RECOVERY OF HEAVY OILS ANO BITUMEN
4127172 - VISCOUS OIL RECOVERY METHOO

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC.

3444931 - METHOD OF TREATING CLAY-CONTAINING FORMATIONS WITH GUANIDINE SALT SOLUTION
3472318 - HYDROCARBON PRODUCTION BY SECONDARY RECOVERY
3476182 - METHOD OF HYDROCARBON PRODUCTION BY SECONDARY RECOVERY USING A MODIFIED INVERTED 9-SPOT WELL PATTERN
3499488 - SECONDARY OIL RECOVERY PROCESS USING STEAM
3515212 - OIL RECOVERY BY STEAM STIMULATION AND IN SITU COMBUSTION
3517744 - HYDROCARBON PRODUCTION BY IN-SITU COMBUSTION AND NATURAL WATER DRIVE
3520364 - METHOD AND APPARATUS FOR INITIATING IN SITU COMBUSTION
3524504 - WELL STIMULATION WITH VAPORIZATION OF FORMATION WATER
3542129 - OIL RECOVERY OF HIGH GRAVITY CRUDES
3543858 - STABILIZATION UNDERGROUND FORMATION
3638727 - METHOD OF TREATING A SUBTERRANEAN HYDROCARBON-BEARING FORMATION
3685581 - SECONDARY RECOVERY OF OIL
3732926 - METHOD FOR RECOVERY OF HYDROCARBONS UTILIZING STEAM INJECTION
3768558 - OIL RECOVERY PROCESS UTILIZING SUPERHEATED STEAM
3768559 - OIL RECOVERY PROCESS UTILIZING SUPERHEATED GASEOUS MIXTURES
3774682 - METHOD FOR INITIATING IN-SITU COMBUSTION
3774684 - HOT FLUID INJECTION INTO HYDROCARBON RESERVOIRS
3807500 - METHOD OF TREATING SUBTERRANEAN FORMATIONS TO IMPROVE PERMEABILITY
3814186 - SECONDARY RECOVERY FOR STEEPLY DIPPING RESERVOIRS COMBINED CELLAR AND ATTIC FLOODING
3822749 - METHOD OF TREATING SUBTERRANEAN FORMATIONS TO IMPROVE PERMEABILITY
3830300 - IN SITU COMBUSTION OIL RECOVERY METHOD
3845823 - METHOD FOR PREVENTING BOTTOM WATER CONING IN OIL WELLS
3847222 - TREATMENT OF AN UNDERGROUND FORMATION CONTAINING WATER-SENSITIVE CLAYS
3858654 - HYDRAULIC MINING TECHNIQUE FOR RECOVERING BITUMEN FROM SUBSURFACE TAR SAND DEPOSITS
3874452 - RECOVERY OF VISCOUS PETROLEUM FROM ASPHALTIC PETROLEUM CONTAINING FORMATIONS SUCH AS TAR SAND DEPOSITS
3905422 - METHOD FOR RECOVERING VISCOUS PETROLEUM
3946808 - PROCESS FOR RECOVERING HYDROCARBONS FROM A SUBTERRANEAN RESERVOIR BY IN SITU COMBUSTION
3964546 - THERMAL RECOVERY OF VISCOUS OIL
3965986 - METHOD FOR OIL RECOVERY IMPROVEMENT
3981362 - IN-SITU COMBUSTION METHOD FOR THE RECOVERY OF HYDROCARBONS
3987853 - METHOD FOR INCREASING THE OIL RECOVERY FROM ACTIVE WATER DRIVE RESERVOIRS
3991828 - THERMAL RECOVERY METHOD
3997004 - METHOD FOR RECOVERING VISCOUS PETROLEUM
4004636 - COMBINED MULTIPLE SOLVENT AND THERMAL HEAVY OIL RECOVERY
4007786 - SECONDARY RECOVERY OF OIL BY STEAM STIMULATION PLUS THE PRODUCTION OF ELECTRICAL ENERGY AND MECHANICAL POWER
4016932 - SURFACTANT OIL RECOVERY METHOD FOR USE IN HIGH TEMPERATURE FORMATIONS CONTAINING WATER HAVING HIGH SALINITY AND HARDNESS
4024915 - RECOVERY OF VISCOUS OIL BY UNHEATED AIR INJECTION, FOLLOWED BY IN SITU COMBUSTION
4026358 - METHOD OF IN SITU RECOVERY OF VISCOUS OILS AND BITUMENS
4034812 - METHOD FOR RECOVERING VISCOUS PETROLEUM FROM UNCONSOLIDATED MINERAL FORMATIONS
4042027 - RECOVERY OF PETROLEUM FROM VISCOUS ASPHALTIC PETROLEUM CONTAINING FORMATIONS INCLUDING TAR SAND DEPOSITS
4048078 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM
4059152 - THERMAL RECOVERY METHOD
4066127 - PROCESSES FOR PRODUCING BITUMEN FROM TAR SANDS AND METHODS FOR FORMING A GRAVEL PACK IN TAR SANDS
4068715 - METHOD FOR RECOVERING VISCOUS PETROLEUM
4079784 - METHOD FOR IN SITU COMBUSTION FOR ENHANCED THERMAL RECOVERY OF HYDROCARBONS FROM A WELL AND IGNITION SYSTEM THEREFOR
4083404 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM
4088188 - HIGH VERTICAL CONFORMANCE STEAM INJECTION PETROLEUM RECOVERY METHOD
4098336 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM
4109722 - THERMAL OIL RECOVERY METHOD
4109723 - THERMAL OIL RECOVERY METHOD
4114687 - SYSTEMS FOR PRODUCING BITUMEN FROM TAR SANDS

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC. (CONTINUEO)
4114691 - METHOD FOR CONTROLLING SAND IN THERMAL RECOVERY OF OIL FROM TAR SANOS
4119566 - PROOUCTION OF NITROGEN-RICH GAS MIXTURES
4124071 - HIGH VERTICAL AND HORIZONTAL CONFORMANCE VISCOUS OIL RECOVERY METHOD
4127171 - METHOD FOR RECOVERING HYDROCARBONS
4129183 - USE OF ORGANIC ACID CHROME COMPLEXES TO TREAT CLAY CONTAINING FORMATIONS

TEXACO TRINIOAD, INC.
3530939 - METHOD OF TREATING ASPHALTIC TYPE RESIDUES

TRW INC.
4059308 - PRESSURE SWING RECOVERY SYSTEM FOR OIL SHALE OEPOSITS
4065183 - RECOVERY SYSTEM FOR OIL SHALE OEPOSITS
4083604 - THERMOMECHANICAL FRACTURE FOR RECOVERY SYSTEM IN OIL SHALE OEPOSITS

TUBIN; E. SAM
4127169 - SECONOARY OIL RECOVERY METHOD AND SYSTEM

UNION OIL COMPANY OF CALIFORNIA
4046199 - STEAM INJECTION APPARATUS AND METHOO

UNITEO STATES OF AMERICA, ATOMIC ENERGY COMMISSION
3794116 - SITU COAL BED GASIFICATION

UNITEO STATES OF AMERICA, OEPARTMENT OF ENERGY
3933447 - UNDERGROUNO GASIFICATION OF COAL
3997005 - METHOO FOR CONTROL OF SUBSURFACE COAL GASIFICATION
4026356 - METHOD FOR IN SITU GASIFICATION OF A SUBTERRANEAN COAL BEO
4062404 - METHOD FOR IN SITU COMBUSTION
4069867 - CYCLIC FLOW UNOERGROUND COAL GASIFICATION PROCESS
4095650 - METHOO FOR INCREASING THE CALORIFIC VALUE OF GAS PROOUCED BY THE IN SITU COMBUSTION OF COAL
4096912 - METHOOS FOR MINIMIZING PLASTIC FLOW OF OIL SHALE OURING IN SITU RETORTING
4122897 - IN SITU GASIFICATION PROCESS FOR PROOUCING PROOUCT GAS ENRICHEO IN CARBON MONOXIOE ANO HYOROGEN

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS ANO SPACE AOM
4061190 - IN-SITU LASER RETORTING OF OIL SHALE

WATASE KINICHI
3864208 - GEOTHERMAL-NUCLEAR WASTE OISPOSAL AND CONVERSION SYSTEM

WORLO ENERGY SYSTEMS
3982592 - IN SITU HYDROGENATION OF HYOROCARBONS IN UNOERGROUNO FORMATIONS
4050515 - INSITU HYDROGENATION OF HYDROCARBONS IN UNOERGROUND FORMATIONS
4078613 - DOWNHOLE RECOVERY SYSTEM

W. R. GRACE + CO.
3603397 - INTRINSIC MOBILITY CONTROL IN PETROLEUM RECOVERY

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
ALEXANDER	HARVEY	C.	610 W. 69TH ST.	ODESSA	TX	79762
4011906 - DOWNHOLE VALVE FOR PARAFFIN CONTROL						
ANTONOVA	ROZA	IVANOVNA	CHONGARSKY BULVAR, 10, KORPUS	MOSCOW		SU
3990514 - METHOD OF CONNECTION OF WELLS						
4083402 - METHOD OF UNDERGROUND GASIFICATION OF A COAL BED						
BODINE	ALBERT	G.	7877 WOODLEY AVE.	VAN NUYS	CA	91406
3952800 - SONIC TECHNIQUE FOR AUGMENTING THE FLOW OF OIL FROM OIL BEARING FORMATIONS						
CLINGMAN	WALTER	L.	2013 ANDOVER COURT	OKLAHOMA CITY	OK	73120
4057106 - HOT WATER FLOOD						
COOPER	JACK	M.	BOX 913	OKMULGEE	OK	74447
4063416 - STEAM GENERATOR						
DEWELL	ROBERT	R.	1517 NANCY LANE	LIBERTY	MO	64068
4067391 - IN-SITU EXTRACTION OF ASPHALTIC SANDS BY COUNTER-CURRENT HYDROCARBON VAPORS						
DISNEY	RALPH	W.	124 E. 4TH ST.	TULSA	OK	74103
4018279 - IN SITU COAL COMBUSTION HEAT RECOVERY METHOD						
4089373 - SITU COAL COMBUSTION HEAT RECOVERY METHOD						
DRIVER	W.	B.	19 SHERIDAN ROAD	ARNOLD	MD	21012
4022279 - FORMATION CONDITIONING PROCESS AND SYSTEM						
DUFOUR	FRANCOIS		824 - 4TH AVE.	VERDUN, QUEBEC		CA
3986558 - PETROLEUM EXTRACTION METHOD AND ASSEMBLY						
FEDOROV	NIKOLAI	ANANIEVIC	B. SERPUKHOVSKAYA ULITSA, 31,	MOSCOW		SU
3990514 - METHOD OF CONNECTION OF WELLS						
FISHER	CHARLES	B.	2850 HILL PARK ROAD	MONTREAL, QUEBEC		CA
3972372 - EXRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS						
FISHER	CHARLES	B.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
FISHER	SIDNEY	T.	2850 HILL PARK RD.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
FISHER	SIDNEY	T.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
3972372 - EXRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS						
GARRETT	DONALD	E.	505 W. 9TH ST.	CLAREMONT	CA	91711
4057293 - PROCESS FOR IN SITU CONVERSION OF COAL OR THE LIKE INTO OIL AND GAS						
GARTE	GILBERT	M.	62 CURTIS ST.	SCITUATE	MA	02066
3941423 - METHOD OF AND APPARATUS FOR EXTRACTING OIL FROM OIL SHALE						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
GERSHEVICH	ELFRICA	GIRSHEVNA	SYTINSKY PEREULOK, 97/14, KV.	MOSCOW		SU
3990514 - METHOD OF CONNECTION OF WELLS						
GOINS	JOHN	T.	2301 NASSAU DRIVE	SEABROOK	TX	77586
4033411 - METHOD FOR STIMULATING THE RECOVERY OF CRUDE OIL						
HAYNES	CHARLES	A.	3308 TIPPS DR.	NEDERLAND	TX	77627
4086960 - APPARATUS FOR HYDROCARBON RECOVERY FROM EARTH STRATA						
HAYNES	CHARLES	A.	3308 TIPPS DRIVE	NEDERLAND	TX	77627
3986556 - HYDROCARBON RECOVERY FROM EARTH STRATA						
HELLEUR	DONALD	EDMUND	221 MORTLAKE AVENUE	ST. LAMBERT, QUEBEC		CA
4079585 - METHOD AND APPARATUS FOR REMOVING VOLATILE FLUIDS						
HUDSON	RAY	E.	2422 BEECHWOOD	ODESSA	TX	79761
4011906 - DOWNHOLE VALVE FOR PARAFFIN CONTROL						
KILBURN	JAMES	S.	3060 B-1/2 RD.	GRAND JUNCTION	CO	81501
4121662 - WATER PURIFICATION WITH FRAGMENTED OIL SHALE						
KREININ	EFIM	VULFOVICH	STARYE KUZMINKI 127A KVARTAL,	MOSCOW		SU
4036298 - METHOD OF CONNECTION OF WELLS BY IN-SITU COMBUSTION						
KREININ	EFIM	VULFOVICH	STARYE KUZMINKI, 127A KVARTAL,	MOSCOW		SU
3990514 - METHOD OF CONNECTION OF WELLS						
KREININ	EFIM	VULFOVICH	ULITSA CHUGUNNYE VOROTA, 21, K	MOSCOW		SU
4024914 - METHOD OF PROCESSING COAL CHANNELS IN UNDERGROUND COAL GASIFICATION						
4083402 - METHOD OF UNDERGROUND GASIFICATION OF A COAL BED						
LEKAS	MITCHELL	A.	1015 BERMUDA DRIVE	CONCORD	CA	94518
4037657 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS BY IN SITU PROCESSING						
NEBOLSINE	ROSTISLAV		64 E. 86TH ST.	NEW YORK	NY	10028
3945436 - METHOD AND APPARATUS FOR CLEANSING WELL LINER AND ADJACENT FORMATIONS						
REYNOLDS	MERRILL	J.	6111 E. SKELLY DR.	TULSA	OK	74135
4089373 - SITU COAL COMBUSTION HEAT RECOVERY METHOD						
REYNOLDS	MERRILL	J.	6111 E. SKELLY DRIVE	TULSA	OK	74135
4018279 - IN SITU COAL COMBUSTION HEAT RECOVERY METHOD						
STODDARD	XERXES	T.	2617 W. 27TH AVE.	DENVER	CO	80212
4058164 - HEATING MINE WATER FOR RECOVERY OF IMMOBILE HYDROCARBONS						
TERRY	RUEL	C.	1330 GAYLORD	DENVER	CO	80206
3987852 - METHOD OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT						
TERRY	RUEL	C.	3090 S. HIGH ST.	DENVER	CO	80210
4058164 - HEATING MINE WATER FOR RECOVERY OF IMMOBILE HYDROCARBONS						
VANDERGRIFT	DONALD	BRUCE	264 SILVERBROOK WAY N.W.	CALGARY ALBERTA		CA
4099570 - OIL PRODUCTION PROCESSES AND APPARATUS						
VOLK	ALFEI	FEDOROVIC	ULITSA KROPOTKINSKAYA, 40, KV.	MOSCOW		SU
3990514 - METHOD OF CONNECTION OF WELLS						
VON HIPPEL	HANS	JOACHIM	LATE OF P.O. OBERSTENWEILER	OBERSTENWEILER		DT
3865186 - METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL						
VON HIPPEL	MILA			OBERSTENWEILER		DT
3865186 - METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL						
ZVYAGINTSEV	KIRILL	NIKOLAEVI	ULITSA DOLGOPRUDNAYA, 13A, KV.	MOSCOW		SU
4036298 - METHOD OF CONNECTION OF WELLS BY IN-SITU COMBUSTION						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3420302 - OIL PROCESSING SYSTEM
3437146 - METHOD OF REMOVING PARAFFIN FROM A WELL WITH HEATED SOLVENT
3480079 - WELL TREATING METHODS USING TEMPERATURE SURVEYS
3497335 - UNDERGROUND GASIFICATION OF COAL
3503868 - METHOD OF EXTRACTING AND CONVERTING PETROLEUM FROM OIL SHALE
3522842 - APPARATUS FOR OIL PRODUCTION AMPLIFICATION BY SPONTANEOUS EMISSION OF RADIATION
3522843 - APPARATUS FOR PRODUCTION AMPLIFICATION BY STIMULATED EMISSION OF RADIATION
3522846 - METHOD AND APPARATUS FOR PRODUCTION AMPLIFICATION BY SPONTANEOUS EMISSION OF RADIATION
3522847 - APPARATUS FOR CLEANING HEAT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION
3522848 - APPARATUS FOR PRODUCTION AMPLIFICATION BY STIMULATED EMISSION OF RADIATION
3595316 - AGGREGATE PROCESS FOR PETROLEUM PRODUCTION
3599714 - METHOD OF RECOVERING HYDROCARBONS BY IN-SITU COMBUSTION
3620571 - SINGLE WELL HEATED GAS MINING METHOD AND APPARATUS
3679264 - GEOTHERMAL IN SITU MINING AND RETORTING SYSTEM
3796265 - METHOD FOR PRODUCING HIGH HYDROGEN SULFIDE CONTENT GAS WELLS
3822747 - METHOD OF FRACTURING AND REPRESSURING SUBSURFACE GEOLOGICAL FORMATIONS EMPLOYING LIQUIFIED GAS
3837401 - HOT FLUID INJECTION INTO HYDROCARBON RESERVOIRS
3842908 - OPEN FLOW PRODUCTION SYSTEM AND METHOD FOR RECOVERY OF SHALLOW OIL RESERVOIRS
3852923 - MATERIAL REMOVING BIT
3853759 - DYNAMIC HYDRAULIC COLUMN ACTIVATION METHOD

3072184	3072185	3072186	3072187	3072188	3072189	3072190	3072191	3072196	3073391	3074483	3076505
3076506	3078487	3080919	3084919	3087540	3087541	3093191	3095925	3097690	3100016	3100528	3101499
3102588	3106246	3108639	3109491	3109492	3110345	3111986	3111987	3113619	3113620	3115928	3115929
3116792	3120264	3120271	3121462	3124196	3124198	3125072	3126953	3126954	3126955	3126956	3126957
3126960	3126961	3127935	3129757	3130781	3131761	3132692	3133591	3134435	3135324	3136359	3138202
3138203	3139928	3141502	3141504	3143169	3145772	3147804	3147805	3149670	3150715	3152638	3153448
3154142	3154143	3155160	3156299	3159215	3159216	3159217	3160208	3163215	3163216	3163227	3165154
3167117	3167121	3169580	3170515	3171479	3171482	3172467	3172468	3172470	3172475	3174543	3174544
3179167	3179169	3180411	3180412	3180414	3182721	3182722	3191679	3193008	3193009	3194311	3195632
3196945	3198249	3202219	3205943	3205944	3205947	3208514	3208519	3208520	3208527	3209822	3209825
3216498	3216499	3217800	3219108	3219110	3221811	3221812	3223158	3223165	3223166	3225827	3227211
3228468	3228471	3232345	3233668	3233671	3234879	3237692	3237696	3239405	3240270	3244231	3246693
3250327	3253652	3254711	3254716	3255820	3258073	3259185	3263750	3266572	3270813	3272261	3272262
3273640	3275076	3279538	3279540	3280910	3282344	3282349	3283814	3284281	3285335	3285336	3288214
3288216	3289416	3289763	3291215	3292699	3292701	3292702	3294167	3298434	3298439	3310109	3312281
3312284	3312285	3314476	3314477	3316020	3316962	3322194	3322195	3323590	3323591	3324945	3324946
3324948	3327782	3330353	3331438	3332480	3332482	3332488	3332489	3333637	3334687	3339634	3339647
3342257	3342258	3342260	3342261	3343598	3343608	3344856	3346044	3349843	3349845	3349846	3349847
3349848	3349849	3349850	3353593	3353602	3354958	3357487	3358754	3358759	3358762	3360041	3361201
3361202	3363686	3363687	3366176	3367417	3368622	3369601	3369604	3371713	3372750	3372754	3373805
3373813	3373814	3375870	3375871	3376928	3376929	3379248	3379249	3379250	3379254	3380530	3382922
3385359	3385360	3385361	3385362	3385363	3386504	3386507	3386508	3386512	3387654	3388742	3388743
3388744	3390725	3392783	3393732	3393733	3394759	3395756	3396791	3396792	3397745	3398793	3399721
3399722	3400760	3400762	3400763	3405761	3406755	3406756	3409077	3409083	3410344	3410345	3410796
3411575	3411578	3412793	3412794	3417818							

I.B. IN SITU CONVERSION: WELLS
1. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,133,380	Occidental Oil Shale, Inc.: Establishing A Combustion Zone Below A Sill Pillar In An In Situ Oil Shale Retort
4,133,381	Occidental Oil Shale, Inc.: Contacting Treated Oil Shale With Carbon Dioxide To Inhibit Leaching
4,133,382	Texaco Canada Inc.: Recovery Of Petroleum From Viscous Petroleum-Containing Formations Including Tar Sands
4,133,384	Texaco Inc.: Steam Flooding Hydrocarbon Recovery Process
4,136,737	Texaco Inc.: Method For Automatically Initiating In Situ Combustion For Enhanced Thermal Recovery Of Hydrocarbons From A Well
4,140,179	Raytheon Company: In Situ Radio Frequency Selective Heating Process
4,140,180	IIT Research Institute: Method For In Situ Heat Processing of Hydrocarbonaceous Formations
4,140,181	Occidental Oil Shale, Inc.: Two-stage Removal Of Sulfur Dioxide From Process Gas Using Treated Oil Shale
4,140,182	Joseph A. Vriend, P.O. Box 505, Squamish, Canada: Method Of Extracting Oil
4,140,184	Ira C. Bechtold, 1987 Skyline Vista Dr., La Habre, CA 90631; H. Randall Emmerson, 47 Rockview Dr., Irvine, CA 92715: Method For Producing Hydrocarbons From Igneous Sources
4,141,415	Texaco Inc.: Method Of Recovering Hydrocarbons By Improving The Vertical Conformance In Heavy Oil Formations
4,143,715	The Dow Chemical Company: Method For Bringing A Well Under Control
4,144,935	IIT Research Institute: Apparatus And Method For In Situ Heat Processing Of Hydrocarbonaceous Formations
4,146,272	Occidental Oil Shale, Inc.: Explosive Placement For Explosive Expansion Toward Spaced Apart Voids

4,147,213 Standard Oil Company: Combustion Air Injection Well

4,147,388 Occidental Oil Shale, Inc.: Method For In Situ Recovery Of Liquid And Gaseous Products From Oil Shale Deposits

4,147,389 Occidental Oil Shale, Inc.: Method For Establishing A Combustion Zone In An In Situ Oil Shale Retort

4,148,358 Occidental Research Corporation: Oxidizing Hydrocarbons, Hydrogen, And Carbon Monoxide

4,148,359 Shell Oil Company: Pressure-Balanced Oil Recovery Process For Water Productive Oil Shale

4,149,595 Occidental Oil Shale, Inc.: In Situ Oil Shale Retort With Variations In Surface Area Corresponding To Kerogen Content of Formation Within Retort Site

4,149,597 Texaco Exploration Canada Ltd.: Method For Generating Steam

4,149,752 Occidental Oil Shale, Inc.: Operation Of An In Situ Oil Shale Retort

4,150,722 Occidental Oil Shale, Inc.: Determining The Locus Of A Retorting Zone In An Oil Shale Retort By Rate Of Shale Oil Production

4,151,877 Occidental Oil Shale, Inc.: Determining The Locus Of A Processing Zone In A Retort Through Channels

4,153,110 Occidental Oil Shale, Inc.: Ignition Of Fragmented Oil Shale Below A Sill Pillar In An In Situ Oil Shale Retort

4,153,298 Occidental Oil Shale, Inc.: Removal Of Pillars From A Void For Explosive Expansion Toward The Void

4,156,421 Carmel Energy, Inc.: Method And Apparatus For Producing Thermal Vapor Steam

4,156,461 Occidental Oil Shale, Inc.: Decreasing Hydrocarbon, Hydrogen And Carbon Monoxide Concentration Of A Gas

4,156,462 Texaco, Inc.: Hydrocarbon Recovery Process

4,156,463 Texaco, Inc.: Viscous Oil Recovery Method

4,156,545 Freeport Minerals Company: Process For Heating And Chemically Treating An Aqueous Process Fluid

4,158,467 Gulf Oil Corporation: Process For Recovering Shale Oil

4,158,638 Gulf Research & Development Company: Recovery Of Oil From Oil Shale

4,160,479 Reginald D. Richardson, 53 Vale Crest Dr., & Robert H. Shannon, 59 Valecrest Dr., both of Islington, Ontario, Canada M9A 4P5: Heavy Oil Recovery Process

4,160,481 The HOP Corporation: Method For Recovering Subsurface Earth Substances

4,161,217 Shell Oil Company: Hot Water Foam Oil Production Process

4,161,981 Texaco Development Corporation: Method For Recovering Hydrocarbons

4,162.706 Occidental Oil Shale, Inc.: Determining The Locus of A Processing Zone In An Oil Shale Retort By Monitoring Pressure Drop Across The Retort

4,162,707 Mobil Oil Corporation: Method of Treating Formation To Remove Ammonium Ions

4,162,808 Gulf Oil Corporation: In-Situ Retorting of Carbonaceous Deposits

4,163,475 Occidental Oil Shale, Inc.: Determining The Locus of A Processing Zone In An In Situ Oil Shale Retort

4,163,476 Texaco, Inc.: Secondary Recovery Process Utilizing An Acrylamido Alkanesulfonic Acid Polymer

4,164,979 Texaco, Inc.: Reservoir Stabilization By Treating Water Sensitive Clays

I. B. IN SITU CONVERSION: WELLS

2. THERMAL EXPLOITATION BY METHODS OTHER THAN FLUID INJECTION OR COMBUSTION

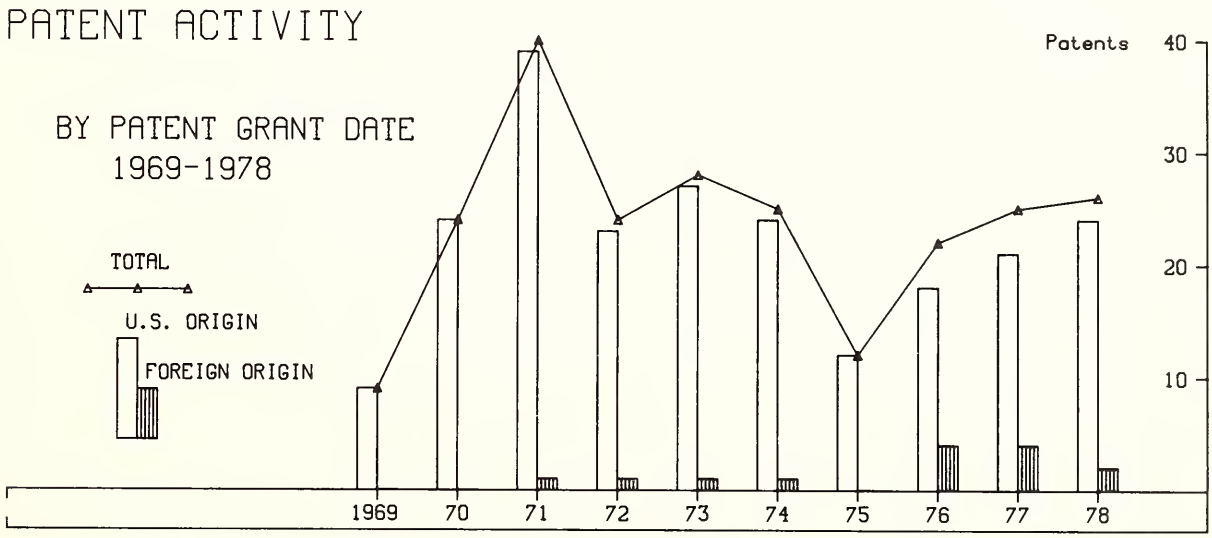
This profile includes in-the-earth conversion of solid carbonaceous material to liquid or gaseous hydrocarbons ultilizing earth bores, including thermal exploitation or treatment by: passing an electric current or electromagnetic wave through the earth; sonic or ultrasonic vibration; nuclear energy; non-nuclear explosives or; using microorganisms.

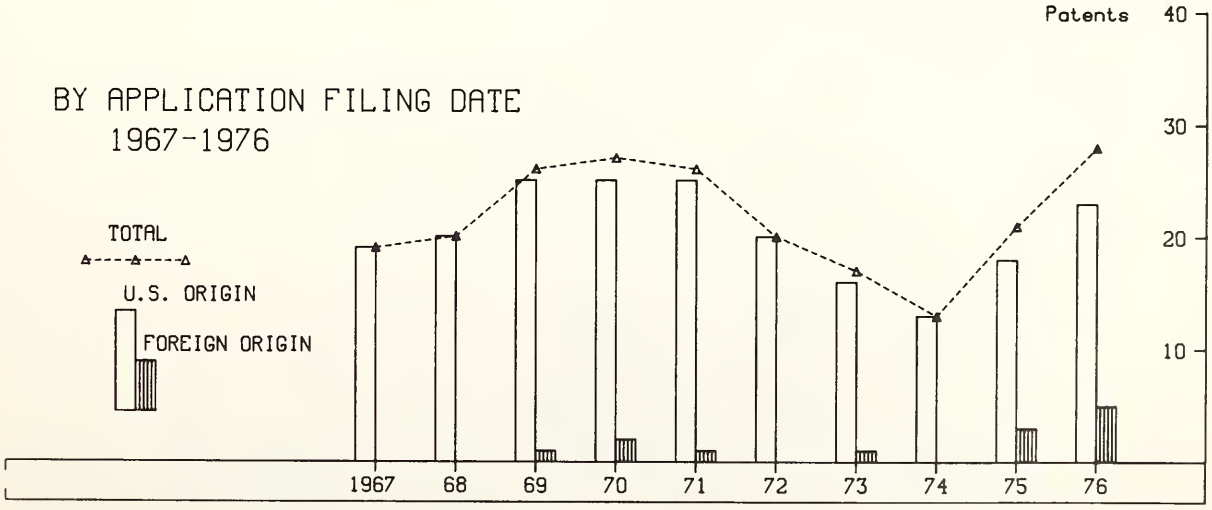
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 166, Subclasses 246-249, 299

ACTIVITY INDICES (1976-1978)

GROWTH	31.1%
FOREIGN SHARE	13.7%
CORPORATE OWNED	65.8%
GOVERNMENT OWNED	4.1%
U.S. OWNED OF FOREIGN	20.0%





SYNTHETIC FUELS I B 2- IN SITU - WELLS - METHODS OTHER THAN FLUID INJECTION OR COMBUSTION

PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	28	21	23	21	12	9	24	40	24	28	25	12	22	25	26	340
U.S. ORIGIN	28	20	19	18	11	9	24	39	23	27	24	12	18	21	24	317
FOREIGN ORIGIN		1	4	3	1			1	1	1	1		4	4	2	23
CANADA									1	1			2	4	1	9
GERMANY		1	3	3	1											8
FRANCE			1								1				1	3
UNITED KINGDOM								1					1			2
U.S.S.R.													1			1
U.S. ORIGIN	28	20	19	18	11	9	24	39	23	27	24	12	18	21	24	317
U.S. CORP. OWNED	22	13	12	13	11	8	20	35	14	19	16	10	14	13	16	236
U.S. GOVT. OWNED	1							1	6	1	5		2	1		17
U.S. INDIV. OWNED	5	7	7	5		1	4	3	3	7	3	2	2	6	6	61
FOREIGN OWNED														1	2	3
FOREIGN ORIGIN		1	4	3	1			1	1	1	1		4	4	2	23
U.S. OWNED									1				1		1	3
FOREIGN OWNED		1	4	3	1			1		1	1		3	4	1	20
FOREIGN CORP.		1	4	3	1			1		1	1					12
FOREIGN GOVT.																
FOREIGN INDIV.													3	4	1	8

SYNTHETIC FUELS I B 2- IN SITU - WELLS - METHODS OTHER THAN FLUID INJECTION OR COMBUSTION

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	18	12	10	19	20	26	27	26	20	17	13	21	28	11		268
U.S. ORIGIN	16	10	10	19	20	25	25	25	20	16	13	18	23	10		250
FOREIGN ORIGIN	2	2				1	2	1		1		3	5	1		18
CANADA							2					2	5			9
GERMANY	2	2														4
FRANCE								1						1		2
UNITED KINGDOM						1						1				2
U.S.S.R.										1						1
U.S. ORIGIN	16	10	10	19	20	25	25	25	20	16	13	18	23	10		250
U.S. CORP. OWNED	13	9	9	17	18	23	14	17	13	12	10	13	15	6		189
U.S. GOVT. OWNED							3	5	3	3		1		1		16
U.S. INDIV. OWNED	3	1	1	2	2	2	8	3	4	1	3	3	6	3		42
FOREIGN OWNED												1	2			3
FOREIGN ORIGIN	2	2				1	2	1		1		3	5	1		18
U.S. OWNED							1					1		1		3
FOREIGN OWNED	2	2				1	1	1		1		2	5			15
FOREIGN CORP.	2	2				1	1	1								7
FOREIGN GOVT.																
FOREIGN INDIV.										1		2	5			8

I.B. IN SITU CONVERSION - WELLS
2. THERMAL EXPLOITATION BY METHODS OTHER THAN FLUID INJECTION OR COMBUSTION

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

PHILLIPS PETROLEUM COMPANY	20
SHELL OIL COMPANY	15
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	14*
ATLANTIC RICHFIELD COMPANY	13
CITIES SERVICE COMPANY	10
MOBIL OIL CORPORATION	8
BRANDON, ORPHA B.	6*
ICI UNITED STATES INC.	5
ELECTROTHERMIC CO.	5
DOW CHEMICAL COMPANY	5
AMERICAN OIL SHALE CORPORATION	4
AMOCO PRODUCTION COMPANY	4
CONTINENTAL OIL COMPANY	4
PAN AMERICAN PETROLEUM CORPORATION	4
SUN OIL COMPANY OF PENNSYLVANIA	4
DRESSER INDUSTRIES, INC.	3
TALLEY-FRAC CORPORATION	3
HUGHES TOOL COMPANY	3
GENERAL ELECTRIC COMPANY	3
MARATHON OIL COMPANY	3
UNION OIL COMPANY OF CALIFORNIA	3
PETRO-CANADA EXPLORATION, INC.	3
PHYSICS INTERNATIONAL COMPANY	3
ELECTRO-PETROLEUM INC. MESNE	2
SCHLUMBERGER TECHNOLOGY CORPORATION	2
CER GEONUCLEAR CORPORATION	2
EXXON PRODUCTION RESEARCH COMPANY	2
KINE-TECH CORPORATION	2
TEXACO INC.	2
JUSTHEIM PETROLEUM COMPANY	2
KENNECOTT COPPER CORPORATION	2

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AKZONA INCORPORATED
3822916 - IN-SITU EXTRACTION OF MINERAL VALUES FROM ORE DEPOSITS

ALEXANDER M.S.
3848674 - METHOD AND APPARATUS FOR FRACTURING OIL AND GAS STRATA

AMCO PRODUCTION COMPANY
3630279 - EXPLOSIVE FRACTURING METHOD

AMERICAN OIL SHALE CORPORATION
3465818 - UNDERCUTTING OF NUCLEARLY DETONATED FORMATIONS BY SUBSEQUENT NUCLEAR DETONATIONS AT GREATER DEPTH AND USES THEREOF IN THE RECOVERY OF VARIOUS MINERALS
3465819 - USE OF NUCLEAR DETONATIONS IN PRODUCING HYDROCARBONS FROM AN UNDERGROUND FORMATION
3589773 - MANAGEMENT OF UNDERGROUND WATER PROBLEMS
3608636 - BENEFICATION OF GEOLOGICAL FORMATIONS BY MEANS OF UNDERGROUND NUCLEAR DETONATIONS AND THE UTILIZATION OF WATER IN CONJUNCTION THEREWITH

AMOCO PRODUCTION COMPANY
3630281 - EXPLOSIVE FRACTURING OF PETROLEUM BEARING FORMATIONS
3630284 - METHOD FOR TREATMENT OF FLUID-BEARING FORMATIONS
3702635 - SEISMIC ENERGY SOURCE USING LIQUID EXPLOSIVE
3743017 - USE OF FLUIDIC PRESSURE FLUCTUATION GENERATOR TO STIMULATE UNDERGROUND FORMATIONS

ATLANTIC RICHFIELD COMPANY
3470953 - MODIFICATION OF CHIMNEY GEOMETRY PRODUCED BY CONTAINED NUCLEAR EXPLOSIVES
3613378 - UNDERGROUND STORAGE
3627044 - METHOD OF PRODUCING TAR SANDS WITH LATERALLY CRATERED NUCLEAR EXPLOSIONS
3659649 - METHOD OF STIMULATING OIL OR GAS RESERVOIRS BY A SUBSURFACE NUCLEAR EXPLOSION
3757860 - WELL HEATING
3766980 - PERMAFROST AND WELL PROTECTION
3848671 - METHOD OF PRODUCING BITUMEN FOR A SUBTERRANEAN TAR SAND FORMATION
3862662 - METHOD AND APPARATUS FOR ELECTRICAL HEATING OF HYDROCARBONACEOUS FORMATIONS
3874450 - METHOD AND APPARATUS FOR ELECTRICALLY HEATING A SUBSURFACE FORMATION
3916993 - METHOD OF PRODUCING NATURAL GAS FROM A SUBTERRANEAN FORMATION
3920072 - METHOD OF PRODUCING OIL FROM A SUBTERRANEAN FORMATION
3948319 - METHOD AND APPARATUS FOR PRODUCING FLUID BY VARYING CURRENT FLOW THROUGH SUBTERRANEAN SOURCE FORMATION
3958636 - PRODUCTION OF BITUMEN FROM A TAR SAND FORMATION

BRANDON ORPHA B.
3422894 - METHOD OF TREATING AND PRODUCING FLUIDS FROM RESERVOIRS OF VARIABLE PERMEABILITY
3503446 - METHOD AND APPARATUS FOR FORMING AND/OR AUGMENTING AN ENERGY WAVE
3718186 - METHOD AND APPARATUS FOR FORMING AND/OR AUGMENTING AN ENERGY WAVE
3923099 - METHODS OF WELL COMPLETION OR WORKOVER OF FLUID CONTAINING SUBSURFACE FORMATIONS
4022275 - METHODS OF USE OF SONIC WAVE GENERATORS AND MODULATORS WITHIN SUBSURFACE FLUID CONTAINING STRATA OR FORMATIONS

BRITISH PETROLEUM COMPANY LIMITED
3616857 - GEOLOGICAL FORMATION HEATING

CABOT CORPORATION
3999609 - EXPLOSIVE WELL STIMULATION METHOD

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CER GEONUCLEAR CORPORATION
3674313 - METHOO FOR EFFECTING OIRECTIONAL NUCLEAR FRACTURING
3777815 - EXPLOSIVE FRACTURING METHOD

CITIES SERVICE COMPANY
3557874 - METHOO OF ORILLING ANO COMPLETING A GAS WELL
3566966 - GAS PROOUCTION BY NUCLEAR STIMULATION
3593793 - STIMULATION OF RECOVERY FROM UNOERGROUNO OEPOSITS
3601193 - IN SITU RETORTING OF OIL SHALE
3674089 - METHOO FOR STIMULATING HYOROCARBON-BEARING FORMATIONS
3690378 - METHOO AND APPARATUS FOR WELL COMPLETION EXPLOSIVE STIMULATION
3692110 - IN SITU RETORTING AND HYDROGENATION OF OIL SHALE
3730274 - METHOO OF OFFSET EXPLOSIVE STIMULATION
3734184 - METHOO OF IN SITU COAL GASIFICATION
4030549 - RECOVERY OF GEOTHERMAL ENERGY

COMPAGNIE FRANCAISE OES PETROLES
3797576 - METHOO AND APPARATUS FOR BREAKING UP ROCKS CONTAINING LIQUIO OR GASEOUS HYOROCARBONS BY MEANS OF EXPLOSIVES

CONTINENTAL OIL COMPANY
3602309 - METHOO OF EXPLODING OR IGNITING MATERIALS USING AOIABATIC COMPRESSION OF GAS
3718366 - METHOO FOR CREATING PERMEABILITY IN SULFUR OEPOSITS
3937520 - IN SITU MINING USING BACTERIA
4109719 - METHOO FOR CREATING A PERMEABLE FRAGMENTEO ZONE WITHIN A SUBTERRANEAN CARBONACEOUS OEPOSIT FOR IN SITU COAL GASIFICATION

OOW CHEMICAL COMPANY
3489218 - METHOO OF KILLING ORGANISMS BY USE OF RAOIOACTIVE MATERIALS
3566969 - METHOD OF GELLING ORGANIC POLAR LIQUIOS ANO COMPOSITIONS SO MADE, AND USE THEREFOR
3690106 - METHOO OF TREATING PERMEABLE FORMATIONS
3710718 - METHOD FOR CREATING UNOERGROUND CAVITIES EMPLOYING EXPLOSIVES
3724542 - METHOD FOR OISPOSAL OF WASTE ACTIVATEO SLUOGE

DRESSER INOUSTRIES, INC.
3589442 - WELL SHOCK OEVICE
3690379 - PLACEMENT AND OETONATION METHOD FOR EXPLOSIVE FRACTURING
3986555 - APPARATUS FOR PROVIDING A PACKAGEO CORE

ORI-FRAC LIMITEO
3713487 - EXPLOSIVE FRACTURING AND PROPPING OF PETROLEUM WELLS

ELECTROFLOOO COMPANY
4037655 - METHOO FOR SECONDARY RECOVERY OF OIL

ELECTRO-PETROLEUM INC. MESNE
3782465 - ELECTRO-THERMAL PROCESS FOR PROMOTING OIL RECOVERY
3857776 - DEEP SUBMERSIBLE POWER ELECTRODE ASSEMBLY FOR GROUNO CONOUCTION OF ELECTRICITY

ELECTRO-SONIC OIL TOOLS, INC.
3527300 - ELECTRO-MECHANICAL TRANSOUCER FOR SECONOARY OIL RECOVERY AND METHOD THEREFOR

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

ELECTROTHERMIC CO.
3507330 - METHOD AND APPARATUS FOR SECONDARY RECOVERY OF OIL
3547193 - METHOD AND APPARATUS FOR FROM SUB-SURFACE FORMATIONS USING ELECTRICITY
3605888 - METHOD AND APPARATUS FOR SECONDARY RECOVERY OF OIL
3620300 - METHOD AND APPARATUS FOR ELECTRICALLY HEATING A SUB-SURFACE FORMATION
3642066 - ELECTRICAL METHOD AND APPARATUS FOR THE RECOVERY OF OIL

EXXON PRODUCTION RESEARCH COMPANY
3533471 - METHOD OF EXPLODING USING REFLECTIVE FRACTURES
3946809 - OIL RECOVERY BY COMBINATION STEAM STIMULATION AND ELECTRICAL HEATING

GENERAL ELECTRIC COMPANY
3724543 - ELECTRO-THERMAL PROCESS FOR PRODUCTION OF OFF SHORE OIL THROUGH ON SHORE WALLS
3878312 - COMPOSITE INSULATING BARRIER
4013538 - DEEP SUBMERSIBLE POWER ELECTRODE ASSEMBLY FOR GROUND CONDUCTION OF ELECTRICITY

GULF OIL CORPORATION
3714895 - METHOD FOR EXCAVATING BY EXPLOSIONS

HUGHES TOOL COMPANY
3520362 - WELL STIMULATION METHOD
3842907 - ACOUSTIC METHODS FOR FRACTURING SELECTED ZONES IN A WELL BORE
3850135 - ACOUSTICAL VIBRATION GENERATION CONTROL APPARATUS

ICI UNITED STATES INC.
3830298 - USE OF RADIATION-INDUCED POLYMERS TO INHIBIT THE INTRUSION OF CONTAMINATING FLUIDS INTO RESERVOIRS
3841401 - PROCESS FOR RECOVERING HYDROCARBON USING POLYMER OBTAINED BY RADIATION POLYMERIZATION
3841402 - FRACTURING WITH RADIATION-INDUCED POLYMERS
3872923 - USE OF RADIATION-INDUCED POLYMERS AS TEMPORARY OR PERMANENT DIVERTING AGENT
3877522 - USE OF RADIATION-INDUCED POLYMERS IN CEMENT SLURRIES

IMPERATRIX
3826308 - PROCESS FOR PRODUCING PRODUCT FROM FOSSIL FUEL

IN SITU TECHNOLOGY, INC.
4114688 - MINIMIZING ENVIRONMENTAL EFFECTS IN PRODUCTION AND USE OF COAL

INSTITUTE OF GAS TECHNOLOGY
4085972 - SITU MINING OF FOSSIL FUEL CONTAINING INORGANIC MATRICES

IRRADIATION CONTROLS INC.
3554283 - SITU RECOVERY OF PETROLEUM-LIKE HYDROCARBONS FROM UNDERGROUND FORMATIONS

JUSTHEIM PETROLEUM COMPANY
3598182 - METHOD AND APPARATUS FOR INSITU DISTILLATION AND HYDROGENATION OF CARBONACEOUS MATERIALS
3766982 - METHOD FOR THE IN-SITU TREATMENT OF HYDROCARBONACEOUS MATERIALS

KELLER CORPORATION
4018293 - METHOD AND APPARATUS FOR CONTROLLED FRACTURING OF SUBTERRANEAN FORMATIONS

KENNECOTT COPPER CORPORATION
3841705 - STIMULATION OF PRODUCTION WELL FOR IN SITU METAL MINING
3863987 - CONTROLLED IN SITU LEACHING OF ORE DEPOSITS UTILIZING PRE-SPLIT BLASTING

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

KINE-TECH CORPORATION
4064935 - OIL WELL STIMULATION APPARATUS
4081031 - OIL WELL STIMULATION METHOD

MARATHON OIL COMPANY
3707187 - FLOODING METHOD USING SALT-INSENSITIVE POLYMERS FOR BETTER MOBILITY CONTROL
3730270 - SHALE OIL RECOVERY FROM FRACTURED OIL SHALE
3844350 - OIL RECOVERY USING POLYMER PRESLUG

MERCK + CO., INC.
3966618 - CLARIFICATION OF XANTHAN GUM

MOBIL OIL CORPORATION
3542131 - METHOD OF RECOVERING HYDROCARBONS FROM OIL SHALE
3565173 - METHODS OF SELECTIVELY IMPROVING THE FLUID COMMUNICATION OF EARTH FORMATIONS
3581824 - OIL RECOVERY PROCESS USING AN IONIC POLYSACCHARIDE THICKENING AGENT
3620301 - METHOD OF IN
3965982 - HYDRAULIC FRACTURING METHOD FOR CREATING HORIZONTAL FRACTURES
3987850 - WELL COMPLETION METHOD FOR CONTROLLING SAND PRODUCTION
4046194 - ELECTROLINKING METHOD FOR IMPROVING PERMEABILITY OF HYDROCARBON FORMATION
4067389 - HYDRAULIC FRACTURING TECHNIQUE

MORAN; THOMAS L.
4103743 - METHOD AND MEANS OF TREATING WATER WELLS

NEW MEXICO TECH RESEARCH FOUNDATION
3616855 - METHOD OF BULKING OR CAVING A VOLUME OF SUBSURFACE MATERIAL

NRG NUFUEL COMPANY
4026355 - METHOD FOR TESTING AND MONITORING FOR PRODUCING LANDFILL GAS

OCCIDENTAL OIL SHALE, INC.
4043597 - MULTIPLE LEVEL PREPARATION OF OIL SHALE RETORT

OIL RECOVERY CORPORATION
4074758 - EXTRACTION METHOD AND APPARATUS

ORPHA BRANDON
3640344 - FRACTURING AND SCAVENGING FORMATIONS WITH FLUIDS CONTAINING LIQUEFIABLE GASES AND ACIDIZING AGENTS

OTIS ENGINEERING CORPORATION
3848668 - APPARATUS FOR TREATING WELLS

PAN AMERICAN PETROLEUM CORPORATION
3451478 - NUCLEAR FRACTURING AND HEATING IN WATER FLOODING
3464490 - FORMATION NUCLEAR FRACTURING PROCESS
3587743 - EXPLOSIVELY FRACTURING FORMATIONS IN WELLS
3677342 - METHOD OF INCREASING SIZE OF UNDERGROUND NUCLEAR CHIMNEY

PERMEATOR CORPORATION
4031959 - METHOD OF MAINTAINING THE PERMEABILITY OF HYDROCARBON RESERVOIR ROCK

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PETRO-CANADA EXPLORATION INC.
4010799 - METHOD FOR REDUCING POWER LOSS ASSOCIATED WITH ELECTRICAL HEATING OF A SUBTERRANEAN FORMATION
4084637 - METHOD OF PRODUCING VISCOUS MATERIALS FROM SUBTERRANEAN FORMATIONS
4084639 - ELECTRODE WELL FOR ELECTRICALLY HEATING A SUBTERRANEAN FORMATION

PFIZER INC.
4119546 - PROCESS FOR PRODUCING XANTHOMONAS HYDROPHILIC COLLOID, PRODUCT RESULTING THEREFROM, AND USE THEREOF IN DISPLACEMENT OF O IL FROM PARTIALLY DEPLETED RESERVOIRS

PHILLIPS PETROLEUM COMPANY
3428125 - HYDRO-ELECTROPYROLYSIS OF OIL SHALE IN SITU
3490529 - PRODUCTION OF OIL FROM A NUCLEAR CHIMNEY IN AN OIL SHALE BY IN SITU COMBUSTION
3521709 - PRODUCING OIL FROM OIL SHALE BY HEATING WITH HOT GASES
3528501 - RECOVERY OF OIL FROM OIL SHALE
3533469 - METHOD OF INSULATING THE ROOF OF A SUBTERRANEAN CAVITY DURING RETORTING
3550685 - SHALE OIL PRODUCTION
3556979 - PROCESS FOR RETORTING OIL SHALE
3593788 - CRUSHING OIL SHALE WITH NUCLEAR EXPLOSIVES
3598181 - OIL RECOVERY EMPLOYING VISCOSIFIERS PRODUCED BY THE ACTION OF ANIONIC SURFACTANTS ON BACTERIAL CULTURES
3611933 - NUCLEAR CAVITY CONFIGURATION CONTROL
3618663 - SHALE OIL PRODUCTION
3625889 - WELL COMPLETION FLUIDS
3630278 - METHOD FOR STRENGHTENING RESERVOIR FRACTURES
3650326 - HYDROCARBON RECOVERY EMPLOYING AQUEOUS MEDIUM DRIVING FLUID HAVING INCREASING VISCOSITY
3698478 - RETORTING OF NUCLEAR CHIMNEYS
3754598 - METHOD FOR PRODUCING A HYDROCARBON-CONTAINING FORMATION
3844348 - METHOD OF CONTROLLING SUBTERRANEAN FORMATION PERMEABILITY EMPLOYING GRAFT-POLYMERIZED BACTERIAL GUM POLYSACCHARIDE COMPO SITIONS
3908760 - METHOD OF TREATING SUBTERRANEAN FORMATIONS WITH AQUEOUS GELS
3965985 - MICROBIAL SYNTHESIS FROM ALDEHYDE CONTAINING HYDROCARBON DERIVED PRODUCTS
4068714 - METHOD FOR ACIDIZING SUBTERRANEAN FORMATIONS

PHYSICS INTERNATIONAL COMPANY
4039030 - OIL AND GAS WELL STIMULATION
4049056 - OIL AND GAS WELL STIMULATION
4091870 - METHOD FOR GENERATING HORIZONTAL FRACTURES IN A WELLBORE

PROBE, INCORPORATED
4084638 - METHOD OF PRODUCTION STIMULATION AND ENHANCED RECOVERY OF OIL

RESOURCES RESEARCH + DEVELOPMENT CORPORATION
3497005 - SONIC ENERGY PROCESS

RICHFIELD OIL CORPORATION
3506069 - PROCESS FOR RECOVERING PETROLEUM UTILIZING A NUCLEAR EXPLOSION

SAN MIGUEL PROJECT, INC.
3500910 - SOLVENT RECOVERY OF PETROLEUM

SCHLUMBERGER TECHNOLOGY CORPORATION
4085798 - METHOD FOR INVESTIGATING THE FRONT PROFILE DURING FLOODING OF FORMATIONS
4105070 - METHODS FOR DETERMINING THE STUCK POINT OF A CONDUIT IN A BOREHOLE

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

SHELL OIL COMPANY
3448801 - METHOD FOR CREATING PERMEABLE FRAGMENTEO ZONE WITHIN AN OIL SHALE FORMATION
3478825 - METHOO OF INCREASING THE VOLUME OF A PERMEABLE ZONE WITHIN AN OIL SHALE FORMATION
3502372 - PROCESS OF OIL
3513913 - OIL RECOVERY FROM OIL SHALES BY TRANSVERSE COMBUSTION
3515213 - SHALE OIL RECOVERY PROCESS USING HEATEO OIL- MISCIBLE FLUIOS
3537528 - METHOD FOR PROOUCING SHALE OIL FROM AN EXFOLIATEO OIL SHALE FORMATION
3547192 - METHOD OF METAL COATING ANO ELECTRICALLY HEATING A SUBTERRANEAN EARTH FORMATION
3565171 - METHOO FOR PROOUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION
3578080 - METHOD OF PRODUCING SHALE OIL FROM AN OIL SHALE FORMATION
3593789 - METHOD FOR PROOUCING SHALE OIL FROM AN OIL SHALE FORMATION
3637020 - TENSILE-STRESS FRACTURING
3666014 - METHOD FOR THE RECOVERY OF SHALE OIL
3712378 - WIRE LINE METHOD ANO APPARATUS FOR CLEANING WELL PERFORATIONS
3957306 - EXPLOSIVE-AIDED OIL SHALE CAVITY FORMATION
4002204 - TIMING THE DEPOSITION OF AN ASPHALT PLUGGING MATERIAL FROM AN ASPHALT-CATIONIC EMULSION

STANOARO OIL COMPANY (INDIANA)
4105251 - DISPERSION OF CATALYSTS WITH EXPLOSIVES FOR IN SITU MINING OF CARBONACEOUS MINERALS

SUN OIL COMPANY OF PENNSYLVANIA
3712379 - MULTIPLE FRACTURING PROCESS
3718188 - METHOO AND SYSTEM FOR WELLBORE PROTECTION WHEN EXPLOSIVELY STIMULATING EARTH FORMATIONS
3771600 - METHOO OF EXPLOSIVELY FRACTURING FROM ORAIN HOLES USING REFLECTIVE FRACTURES
3970146 - SONIC CLEANING OF WELLS

SUN RESEARCH AND OEVELOPMENT COMPANY
3846290 - RECLAMATION OF HYOROCARBON CONTAMINATED GROUND WATERS

TALLEY-FRAC CORPORATION
3561532 - WELL FRACTURING METHOO USING EXPLOSIVE SLURRY
3659652 - LIQUIO EXPLOSIVE FOR WELL FRACTURING
3948176 - MECHANICAL INITIATOR FOR DETONATION OF EXPLOSIVES

TENNECO OIL COMPANY
3489217 - METHOD OF DETERMINING THE MOVEMENT OF HEAT IN A SUBTERRANEAN FORMATION USING BACTERIA ANALYSIS

TEXACO INC.
4078607 - OIL RECOVERY PROCESS USING IMPROVEO THICKENED AQUEOUS FLOOOING LIQUIOS
4104193 - IMPARTING SUPERIOR VISCOSITY TO AQUEOUS POLYSACCHARIOE SOLUTIONS

TRIANGLE SERVICE INC.
3709296 - WELL BORE ZONE PLUGGING METHOO AND APPARATUS

ULTRASONIC ENERGY CORPORATION
3990512 - METHOO AND SYSTEM FOR ULTRASONIC OIL RECOVERY

UNION OIL COMPANY OF CALIFORNIA
4039028 - MOBILITY CONTROL OF AQUEOUS FLUIDS IN POROUS MEOIA
4078612 - WELL STIMULATING PROCESS
4128482 - MOBILITY CONTROL OF AQUEOUS FLUIOS IN POROUS MEDIA

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES OF AMERICA, ATOMIC ENERGY COMMISSION
3627041 - GAS RECOVERY
3640336 - RECOVERY OF GEOTHERMAL ENERGY BY MEANS OF UNDER-GROUND NUCLEAR DETONATIONS
3688843 - NUCLEAR EXPLOSIVE METHOD FOR STIMULATING HYDROCARBON PRODUCTION FROM PETROLIFEROUS FORMATIONS
3703208 - REDUCTION OF RADIOACTIVE GAS CONTAMINATION OF NUCLEAR DETONATIONS IN GEOLOGICAL FORMATIONS
3706630 - NUCLEAR CHIMNEY RADIOACTIVE WASTE DISPOSAL
3707188 - NON COLLAPSE STEMMING OF CASING SUBJECTED TO EXPLOSIVE EFFECTS
3712374 - SEQUENTIAL NUCLEAR EXPLOSION FRACTURING OF GEOLOGICAL FORMATIONS
3786858 - METHOD OF EXTRACTING HEAT FROM DRY GEOTHERMAL RESERVOIRS
3794116 - SITU COAL BED GASIFICATION
3808128 - DRILLING MUD COMPOSITION FOR SHIELDING UNDERGROUND NUCLEAR EXPLOSIVE DEVICES
3814185 - METHOD FOR INTERCONNECTING NUCLEAR CHIMNEYS
3823981 - SITU LEACHING SOLVENT EXTRACTION-PROCESS

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3932300 - SYSTEM FOR DISPOSING OF RADIOACTIVE WATER
3964792 - EXPLOSIVE FLUID TRANSMITTED SHOCK METHOD FOR MINING DEEPLY BURIED COAL

UNITED STATES OF AMERICA, INTERIOR
3696866 - METHOD FOR PRODUCING RETORTING CHANNELS IN SHALE DEPOSITS

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM
4061190 - IN-SITU LASER RETORTING OF OIL SHALE

UNIVERSITY OF SOUTHERN CALIFORNIA
3982995 - METHOD OF CONVERTING OIL SHALE INTO A FUEL

WATASE KINICHI
3864208 - GEOTHERMAL-NUCLEAR WASTE DISPOSAL AND CONVERSION SYSTEM

WESTERN COMPANY OF NORTH AMERICA
3587744 - FRACTURING OF SUBSURFACE FORMATIONS

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
ABBOTT	PHILLIP	ANDREW	1430 FOUNTAINVIEW DRIVE, NO. 3	HOUSTON	TX	77057
4046657 - APPARATUS AND METHOD OF ASSISTING PILE DRIVING BY ELECTRO-OSMOSIS						
ALADIEV	IVAN	TIMOFEEVI	ULITSA GEORIU-DEZH, 3, KV. 11	MOSCOW		SU
3938592 - ROCK-EXPLOITATION METHOD BASED ON THERMODYNAMIC CYCLES UTILIZING IN-SITU ENERGY SOURCE						
BODINE	ALBERT	G.	7877 WOODLEY AVE.	VAN NUYS	CA	91406
3952800 - SONIC TECHNIQUE FOR AUGMENTING THE FLOW OF OIL FROM OIL BEARING FORMATIONS						
CARPENTER	NEIL	L.	RTE. 1, BOX 246J2	KERRVILLE	TX	78028
4071278 - LEACHING METHODS AND APPARATUS						
CHRISTENSON	LOWELL	B.	7410 THUROW	HOUSTON	TX	77087
4119511 - APPARATUS AND METHOD OF ASSISTING PILE DRIVING BY ELECTRO-OSMOSIS						
4124483 - APPARATUS AND METHOD OF ASSISTING PILE DRIVING BY ELECTRO-OSMOSIS						
DISMUKES	NEWTON	BRADFORD	2952 BUTTONWOOD DR.	CARROLLTON	TX	75006
4114689 - RECOVERY OF PETROLEUM						
DRIVER	W.	B.	19 SHERIDAN ROAD	ARNOLD	MD	21012
4022279 - FORMATION CONDITIONING PROCESS AND SYSTEM						
FARDZINOV	VALERY	KOMBOLATO	STRASTNOI BULVAR 13-A, KV. 42	MOSCOW		SU
3938592 - ROCK-EXPLOITATION METHOD BASED ON THERMODYNAMIC CYCLES UTILIZING IN-SITU ENERGY SOURCE						
FISHER	CHARLES	B.	2850 HILL PARK ROAD	MONTREAL, QUEBEC		CA
3972372 - EXRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
3989107 - INDUCTION HEATING OF UNDERGROUND HYDROCARBON DEPOSITS						
4008761 - METHOD FOR INDUCTION HEATING OF UNDERGROUND HYDROCARBON DEPOSITS USING A QUASI-TOROIDAL CONDUCTOR ENVELOPE						
4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS						
4049053 - RECOVERY OF HYDROCARBONS FROM PARTIALLY EXHAUSTED OIL WELLS BY MECHANICAL WAVE HEATING						
FISHER	CHARLES	B.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
FISHER	SIDNEY	T.	2850 HILL PARK RD.	MONTREAL, QUEBEC		CA
4116273 - INDUCTION HEATING OF COAL IN SITU						
FISHER	SIDNEY	T.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
3972372 - EXRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
3989107 - INDUCTION HEATING OF UNDERGROUND HYDROCARBON DEPOSITS						
4008761 - METHOD FOR INDUCTION HEATING OF UNDERGROUND HYDROCARBON DEPOSITS USING A QUASI-TOROIDAL CONDUCTOR ENVELOPE						
4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS						
4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS						
4049053 - RECOVERY OF HYDROCARBONS FROM PARTIALLY EXHAUSTED OIL WELLS BY MECHANICAL WAVE HEATING						
GOGARTY	WILLIAM	B.	7643 S. RACE ST.	LITTLETON	CO	80122
3973629 - INJECTION PROFILES WITH RADIATION INDUCED COPOLYMERS						
GOODMAN	CLARK		95 ANTIQUA COURT	CORONADO	CA	92118
4071278 - LEACHING METHODS AND APPARATUS						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
GUKOV	GENNADY	PETROVICH	ULITSA LESNEYA, 6, KV. 13	MOSKOVSKAYA, POSELEK		SU
3938592 - ROCK-EXPLOITATION METHOD BASED ON THERMODYNAMIC CYCLES UTILIZING IN-SITU ENERGY SOURCE						
HENNING	JACK	A.	P.O. BOX 158	REFUGIO	TX	78377
4007790 - BACK-OFF APPARATUS AND METHOD FOR RETRIEVING PIPE FROM WELLS						
JENKINS	JERALD	D.	404 MILLS	DUMAS	TX	79029
3899027 - METHOD OF CLEANING AND STIMULATING A WATER WELL						
KNIGHT	BRUCE	L.	713 HAWTHORNE	FINDLAY	OH	45840
3973629 - INJECTION PROFILES WITH RADIATION INDUCED COPOLYMERS						
LEKAS	MITCHELL	A.	1015 BERMUDA DRIVE	CONCORD	CA	94518
4037657 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS BY IN SITU PROCESSING						
RHUDY	JOHN	S.	6642 S. OGDIN	LITTLETON	CO	80121
3973629 - INJECTION PROFILES WITH RADIATION INDUCED COPOLYMERS						
SAPEROV	EVGENY	VALENTINO	POSELOK MOSKVORECHIE, 52, KV.	MOSCOW		SU
3938592 - ROCK-EXPLOITATION METHOD BASED ON THERMODYNAMIC CYCLES UTILIZING IN-SITU ENERGY SOURCE						
STOUT	DANIEL	W.	110 WETTAW LA.	NORTH PALM BEACH	FL	33408
4113036 - LASER DRILLING METHOD AND SYSTEM OF FOSSIL FUEL RECOVERY						
VOSKRESENSKY	KIRILL	DMITRIEVI	KOMSOMOLSKY PROSPEKT, 14/1, KV	MOSCOW		SU
3938592 - ROCK-EXPLOITATION METHOD BASED ON THERMODYNAMIC CYCLES UTILIZING IN-SITU ENERGY SOURCE						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3530936 - ELECTRICAL METHOD AND MEANS FOR MINIMIZING CLOGGING OF A WATER WELL
3542431 - BACTERIOLOGICAL MINING OF SULPHUR BEARING DEPOSITS
3578081 - SONIC METHOD AND APPARATUS FOR AUGMENTING THE FLOW OF OIL FROM OIL BEARING STRATA
3623555 - SUBTERRANEAN DRILLING METHOD
3630283 - METHOD OF PRODUCING PARTICLES OF ROCK IN A SUBTERRANEAN SITUS
3674093 - METHOD AND APPARATUS FOR STIMULATING THE FLOW OF OIL WELLS
3713484 - STRINGSHOT BACK-OFF TOOL
3721297 - METHOD FOR CLEANING WELLS
3727690 - METHOD OF FRACTURING A NATURAL GAS BEARING EARTH FORMATION
3747679 - METHOD OF FRACTURING A FORMATION USING A LIQUID EXPLOSIVE
3765477 - GEOTHERMAL-NUCLEAR ENERGY RELEASE AND RECOVERY SYSTEM
3771601 - WELL BORE BLOCKING METHOD
3794114 - USE OF LIQUEFIABLE GAS TO CONTROL LIQUID FLOW IN PERMEABLE FORMATIONS
3838736 - TIGHT OIL OR GAS FORMATION FRACTURING PROCESS
3848672 - SONIC RETORTING TECHNIQUE FOR IN SITU MINING OF CARBONACEOUS MATERIAL

3075463	3079995	3080918	3083778	3085957	3090113	3103975	3104706	3105014	3106244	3113620	3113621
3114419	3115226	3118500	3126055	3130552	3133591	3134437	3137347	3139142	3141099	3141504	3145770
3149672	3151679	3159217	3163112	3164207	3167122	3169577	3170842	3174545	3174561	3185216	3189088
3189092	3189536	3191677	3191678	3198268	3202215	3208518	3208526	3208674	3211220	3214343	3219537
3220476	3227214	3233669	3233670	3235005	3236304	3237689	3240273	3242987	3246695	3247901	3251417
3255820	3262274	3262857	3270668	3270815	3273642	3274784	3278335	3279540	3283814	3288211	3291215
3302720	3303881	3305016	3312279	3314477	3322196	3323592	3325373	3326286	3332487	3335798	3336981
3336982	3339635	3340930	3341424	3342257	3342732	3349850	3352119	3352360	3367442	3368620	3372748
3372755	3373810	3373811	3380551	3395756	3404919	3409082	3416487	3417823	4060128		

I.B. IN SITU CONVERSION: WELLS
2. THERMAL EXPLOITATION BY MEANS OTHER THAN FLUID INJECTION OR COMBUSTION

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,135,579	Raytheon Company: In Situ Processing Of Organic Ore Bodies
4,140,179	Raytheon Company: In Situ Radio Frequency Selective Heating Process
4,140,180	IIT Research Institute: Method For In Situ Heat Processing Of Hydrocarbonaceous Formations
4,141,842	Mobil Oil Corporation: Waterflood Oil Recovery Process Employing Stabilized Biopolymers
4,144,935	IIT Research Institute: Apparatus And Method For In Situ Heat Processing Of Hydrocarbonaceous Formations
4,146,095	D. Ivan Al Spaw, 334 Meadows Bldg., Dallas, TX: Method And Apparatus For Nuclear Heating Of Oil-Bearing Formations
4,146,272	Occidental Oil Shale, Inc.: Explosive Placement For Explosive Expansion Toward Spaced Apart Voids
4,157,287	Lowell B. Christenson, 7410 Thurow, Houston, TX 77087: Method Of Assisting Pile Driving By Electro-Osmosis
4,160,412	Thomas A. Edgell & Roberta K. Tillinghast, both of Houston, TX: Earth Fracturing Apparatus
4,163,580	TRW Inc.: Pressure Swing Recovery System For Mineral Deposits
4,164,978	Winton Corporation: Oil Extraction Method
4,165,257	Continental Oil Company: Biopolymer Filterability Improvement By Caustic-Enzyme Treatment

I. B. IN SITU CONVERSION: WELLS

3. RECOVERY OF SOLID HYDROCARBONS OR OTHER VALUABLE MATERIAL WITH DESIRED LIQUID OR GASEOUS HYDROCARBONS

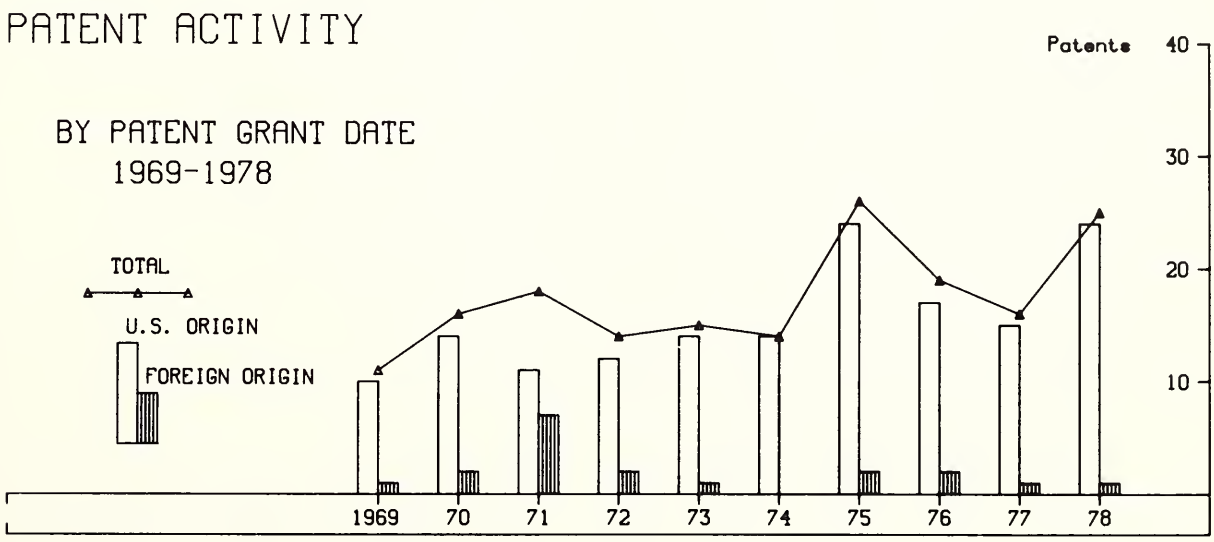
This profile includes in-the-earth conversions of solid carbonaceous material to liquid or gaseous hydrocarbons using earth bores, wherein some of the obtained hydrocarbon remains in the solid state and/or another valuable material is obtained in addition to the liquid or gaseous hydrocarbon.

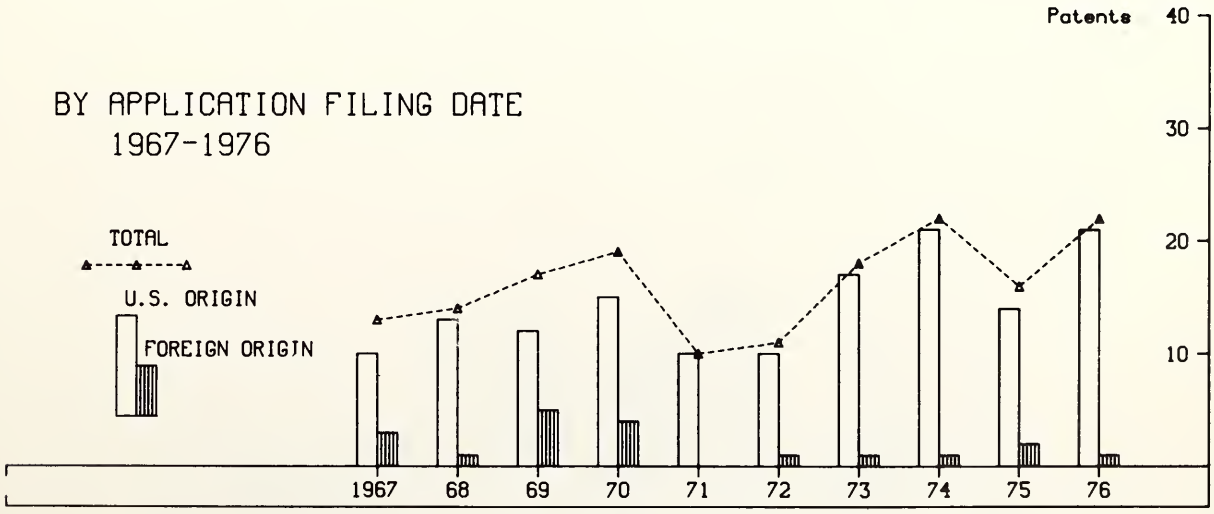
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 299, Subclasses 4 and 5

ACTIVITY INDICES (1976-1978)

GROWTH	34.5%
FOREIGN SHARE	6.7%
CORPORATE OWNED	80.0%
GOVERNMENT OWNED	5.0%
U.S. OWNED OF FOREIGN	0.0%





SYNTHETIC FUELS I B 3- IN SITU - WELLS - RECOVERY OF SOLIDS WITH LIQUID OR GASEOUS HYDROCARBONS

PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	9	4	10	12	16	11	16	18	14	15	14	26	19	16	25	225
U.S. ORIGIN	9	3	7	12	12	10	14	11	12	14	14	24	17	15	24	198
FOREIGN ORIGIN		1	3		4	1	2	7	2	1		2	2	1	1	27
CANADA		1	3		4	1	1	4	1				2	1	1	19
NETHERLANDS								2								2
GERMANY									1			1				2
UNITED KINGDOM							1			1						2
TURKEY								1								1
BELGIUM												1				1
U.S. ORIGIN	9	3	7	12	12	10	14	11	12	14	14	24	17	15	24	198
U.S. CORP. OWNED	6	2	7	10	10	8	8	11	9	14	12	18	13	13	20	161
U.S. GOVT. OWNED							2				1	3		1	2	9
U.S. INDIV. OWNED	3	1				2	2		2		1	3	4	1	2	21
FOREIGN OWNED				2	2		2		1							7
FOREIGN ORIGIN		1	3		4	1	2	7	2	1		2	2	1	1	27
U.S. OWNED		1	3		2			4		1						11
FOREIGN OWNED					2	1	2	3	2			2	2	1	1	16
FOREIGN CORP.					2	1	1	3	2			1	1	1		12
FOREIGN GOVT.																
FOREIGN INDIV.							1					1	1		1	4

SYNTHETIC FUELS I B 3- IN SITU - WELLS - RECOVERY OF SOLIDS WITH LIQUID OR GASEOUS HYDROCARBONS

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	5	9	16	13	14	17	19	10	11	18	22	16	22	10		202
U.S. ORIGIN	4	8	14	10	13	12	15	10	10	17	21	14	21	10		179
FOREIGN ORIGIN	1	1	2	3	1	5	4		1	1	1	2	1			23
CANADA	1	1	2	2	1	3	1			1		2	1			15
NETHERLANDS						1	1									2
GERMANY							1		1							2
UNITED KINGDOM				1			1									2
TURKEY						1										1
BELGIUM											1					1
U.S. ORIGIN	4	8	14	10	13	12	15	10	10	17	21	14	21	10		179
U.S. CORP. OWNED	4	6	13	6	9	10	13	10	10	12	14	12	18	9		146
U.S. GOVT. OWNED					2					1	3		2	1		9
U.S. INDIV. OWNED				3		2	1			4	4	2	1			17
FOREIGN OWNED		2	1	1	2		1									7
FOREIGN ORIGIN	1	1	2	3	1	5	4		1	1	1	2	1			23
U.S. OWNED	1		1			2	3									7
FOREIGN OWNED		1	1	3	1	3	1		1	1	1	2	1			16
FOREIGN CORP.		1	1	2	1	3	1			1	1	1				12
FOREIGN GOVT.																
FOREIGN INDIV.				1					1			1	1			4

I.B. IN SITU CONVERSION - WELLS
3. RECOVERY OF SOLID HYDROCARBONS OR OTHER VALUABLE MATERIAL WITH DESIRED LIQUID OR GASEOUS HYDROCARBONS

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

SHELL OIL COMPANY	22
KENNECOTT COPPER CORPORATION	16
ATLANTIC RICHFIELD COMPANY	8
INTERNATIONAL SALT COMPANY	7
CONTINENTAL OIL COMPANY	6
KALIUM CHEMICALS LIMITED	6
DOW CHEMICAL COMPANY	4
PHILLIPS PETROLEUM COMPANY	4
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	4*
UNITED STATES OF AMERICA, INTERIOR	4
EXXON PRODUCTION RESEARCH COMPANY	3
SYRACUSE UNIVERSITY RESEARCH CORPORATION	3
TRW INC.	3
CITIES SERVICE COMPANY	3
MOBIL OIL CORPORATION	3
UNITED STATES STEEL CORPORATION	3
AKZONA INCORPORATED	3
BECHTEL INTERNATIONAL CORP.	2
OTISCA INDUSTRIES LTD.	2
COPPER RANGE COMPANY	2
AMOCO PRODUCTION COMPANY	2
PPG INDUSTRIES INC.	2
IN SITU TECHNOLOGY, INC.	2
W. R. GRACE + CO.	2
TEXACO INC.	2

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AKZONA INCORPORATED
3820847 - METHOD OF MINING A DEPOSIT OF ROCK SALT OR THE LIKE
3822916 - IN-SITU EXTRACTION OF MINERAL VALUES FROM ORE DEPOSITS
3873156 - BEDDED UNDERGROUND SALT DEPOSIT SOLUTION MINING SYSTEM

ALLIED CHEMICAL CORPORATION
3632171 - METHOD OF CONTROLLING GROWTH OF BRINE WELLS

AMOCO PRODUCTION COMPANY
3645551 - CONVERSION OF UNDERGROUND SULFUR DEPOSITS
3846311 - METHOD FOR REMOVING ELEMENTAL SULFUR FROM WELLS AND FLOWLINES

ANACONDA COMPANY
3441316 - RECOVERY OF METAL VALUES BY LEACHING

ANLIN COMPANY OF NEW JERSEY
3728430 - METHOD FOR PROCESSING COPPER VALUES

ARMOUR + COMPANY
3623769 - METHOD AND APPARATUS FOR SOLUTION MINING

ATLANTIC RICHFIELD COMPANY
3586377 - METHOD OF RETORTING OIL SHALE IN-SITU
4032194 - METHOD FOR THE PRODUCTION OF MINERALS
4066297 - PROCESS FOR THE RECOVERY OF URANIUM
4082359 - METHOD FOR THE RECOVERY OF A MATERIAL
4083603 - METHOD FOR THE SOLUTION MINING OF A MINERAL
4105252 - SOLUTION MINING OF MINERALS FROM VERTICALLY SPACED ZONES
4108722 - METHOD FOR THE RESTORATION OF AN UNDERGROUND RESERVOIR
4129334 - METHOD FOR LOCATING THE REMAINING RECOVERABLE MINERAL RESERVES DURING SOLUTION MINING

BECHTEL INTERNATIONAL CORP.
3833709 - RECOVERY OF MAGNESIUM CHLORIDE HEXAHYORATE FROM CARNALLITE ORE
3998492 - METHOD FOR SELECTIVELY EXTRACTING MAGNESIUM CHLORIDE HEXAHYDRATE FROM MAGNESIUM CHLORIDE HEXAHYDRATE BEARING MATERIALS I
N SITU BY SOLUTION MINING

BROWNE ENGINEERING CORPORATION
3596995 - CHANNELING APPARATUS AND METHOD

CANADIAN PATENTS + DEVELOPMENT LIMITED
3512945 - DISSOLUTION OF POTASSIUM CHLORIDE ORES

CELANESE CANADA LIMITED
3556596 - EXTRACTION OF SOLUBLE MATERIAL FROM NATURAL DEPOSITS

CITIES SERVICE COMPANY
3490811 - IN SITU ACIDULATION OF PHOSPHATE ROCK
3600040 - ROOF BOLTING AND COLUMN BUILDING FOR SOLUTION MINING
3713698 - URANIUM SOLUTION MINING PROCESS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CITIES SERVICE RESEARCH AND DEVELOPMENT COMPANY
3915234 - IN SITU PRODUCTION OF HYDROCARBON VALUES FROM OIL SHALE USING H/2\ S AND CO/2\

CONTINENTAL OIL COMPANY
3437451 - SELECTIVE PRECIPITATION OF POTASSIUM CHLORIDE FROM BRINE USING ORGANOAMINES
3574402 - FRACTURE INITIATION BY DISSOLVING A SOLUBLE FORMATION
3716272 - METHOD OF CREATING LARGE DIAMETER CYLINDRICAL CAVITIES BY SOLUTION MINING
3718366 - METHOD FOR CREATING PERMEABILITY IN SULFUR DEPOSITS
3937520 - IN SITU MINING USING BACTERIA
3994531 - METHOD OF SOLUTION MINING POTASSIUM CHLORIDE FROM SUBTERRANEAN DEPOSITS

COPPER RANGE COMPANY
3775097 - METHOD OF EXTRACTING A METAL FROM A MATERIAL CONTAINING THE METAL IN ELEMENTAL FORM
3853353 - METHOD OF EXTRACTING A METAL FROM A MATERIAL CONTAINING THE METAL IN ELEMENTAL FORM

DIAMOND SHAMROCK CORPORATION
3934650 - RECOVERY OF NATURAL GAS DURING SOLUTION MINING OF AN UNDERGROUND SALT DEPOSIT

DOW CHEMICAL COMPANY
3606465 - METHOD OF RECOVERING MINERAL VALVES FROM AN UNDERGROUND FORMATION
3647261 - PROCESS FOR SOLUTION MINING OF SILVER
3709295 - FRACTURING OF SUBTERRANEAN FORMATIONS
4017120 - PRODUCTION OF HOT BRINES FROM LIQUID-DOMINATED GEOTHERMAL WELLS BY GAS-LIFTING

E. I. DU PONT DE NEMOURS AND COMPANY
3902422 - EXPLOSIVE FRACTURING OF DEEP ROCK

EXXON PRODUCTION RESEARCH COMPANY
3574599 - MINERAL REVOVERY
3653717 - ARTIFICIAL LIFT SYSTEM
4074754 - METHOD FOR PRODUCING GEOTHERMAL ENERGY AND MINERALS

FREEPORT MINERALS COMPANY
4035023 - APPARATUS AND PROCESS FOR HYDRAULIC MINING

GARRETT DONALD E.
3918916 - PLURAL CHAMBER SERIAL FLOW FORCED AIR COOLED CRYSTALLIZER

GEOKINETICS, INC.
3980339 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS

GREAT CANADIAN OIL SANDS LIMITED
3510168 - METHOD OF MINING BITUMINOUS TAR SANDS

HARDY SALT COMPANY
3510167 - METHODS OF SOLUTION MINING

HOLMES NARVER, INC.
4017309 - THIN LAYER LEACHING METHOD

IN SITU TECHNOLOGY, INC.
4018481 - GASIFICATION OF COAL IN SITU
4113313 - RECOVERING URANIUM FROM COAL IN SITU

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

INTERNATIONAL SALT COMPANY
3421794 - SOLUTION MINING AND REFINING MINERALS
3661424 - GEOTHERMAL ENERGY RECOVERY FROM DEEP CAVERNS IN SALT OEPOSITS BY MEANS OF AIR FLOW
3676078 - SALT SOLUTION MINING ANO GEOTHERMAL HEAT UTILIZATION SYSTEM
3702059 - GROUTING FISSURES IN UNOERGROUNO ROCK SALT DEPOSITS
3724898 - SOLUTION MINING OF SALT ANO STORAGE OF INOUSTRIAL FLUIDS
3858397 - CARRYING OUT HEAT-PROMOTABLE CHEMICAL REACTIONS IN SOOIUM CHLORIOE FORMATION CAVERN
3864917 - GEOTHERMAL ENERGY SYSTEM

KALIUM CHEMICALS LIMITED
3495875 - APPARATUS FOR INTROOUCING A OEVICE THROUGH A BORE HOLE CASING
3556597 - TELESCOPIC WASH OOWN LINER ANO METHOO OF SOLUTION MINING
3578808 - SOLUTION MINING METHOD ANO APPARATUS
3600039 - METHOD OF MINING SUBTERRANEAN RUBBLE PILES
3637261 - TOP LATCH SELECT LINER WITH TAILPIPE ANO METHOO OF INSTALLING
3652129 - SOLUTION MINING METHOD

KENNECOTT COPPER CORPORATION
3639003 - PROCESS FOR LEACHING METAL VALUES FROM MINERAL-BEARING EARTH MATERIAL
3809430 - SLOPE CAVE LEACHING OF EXPOSED OR NEAR-SURFACE MINERALIZEO OEPOSITS
3815957 - CONTROLLEO IN-SITU LEACHING OF MINERAL VALUES
3834760 - IN-SITU GENERATION OF ACID FOR IN-SITU LEACHING OF COPPER
3841705 - STIMULATION OF PROOUCTION WELL FOR IN SITU METAL MINING
3863987 - CONTROLLEO IN SITU LEACHING OF ORE DEPOSITS UTILIZING PRE-SPLIT BLASTING
3881774 - OXIDATION OF SULFIDE OEPOSITS CONTAINING COPPER VALUES
3894770 - WELLBORE OXIOATION OF LIXIVIANTS
3910636 - PROCESS FOR IN-SITU MINING
3917345 - WELL STIMULATION FOR SOLUTION MINING
3951458 - METHOD OF EXPLOSIVE FRACTURING OF A FORMATION AT OEPTH
4043599 - ACID PREINJECTION TO DECREASE INSTANTANEOUS ACID CONSUMPTION IN IN-SITU MINING
4045084 - IN-SITU MINING OF COPPER ANO NICKEL
4079998 - LIXIVIANT RECIRCULATOR FOR IN SITU MINING
4116488 - IN-SITU MINING METHOD ANO APPARATUS
4125289 - METHOD FOR IN SITU MINEFIELDS

KOPPERS COMPANY INC.
3990513 - METHOO OF SOLUTION MINING OF COAL

MARATHON OIL COMPANY
3606466 - SUBTERRANEAN BRINE PURIFICATION

MCOONNELL OOUGLAS CORPORATION
3596993 - METHOO OF EXTRACTING OIL ANO BY-PROOUCTS FROM OIL SHALE

MOBIL OIL CORPORATION
4079783 - METHOO OF TREATING FORMATION TO REMOVE AMMONIUM IONS
4103963 - CALCITE CONTROL IN AN IN SITU LEACH OPERATION
4114693 - METHOO OF TREATING FORMATION TO REMOVE AMMONIUM IONS WITHOUT OECREASING PERMEABILITY

MORTON-NORWICH PROOUCTS, INC.
3891397 - CRYSTALLIZATION OF SODIUM CHLORIOE OF REOUCEO CALCIUM SULFATE CONTENT IN PRESENCE OF ABOUT 5 TO ABOUT 500 PPM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

NEW MEXICO TECH RESEARCH FOUNDATION
3973628 - IN SITU SOLUTION MINING OF COAL

OCCIDENTAL MINERALS CORPORATION
4085971 - ENERGY CONSERVING MINING SYSTEM AND METHOD

OCCIDENTAL OIL SHALE, INC.
4105072 - PROCESS FOR RECOVERING CARBONACEOUS VALUES FROM POST IN SITU OIL SHALE RETORTING

OCCIDENTAL PETROLEUM CORPORATION
3612608 - PROCESS TO ESTABLISH COMMUNICATION BETWEEN WELLS IN MINERAL FORMATIONS

OTISCA INDUSTRIES LTD.
3941679 - SEPARATION OF HYDROCARBONACEOUS SUBSTANCES FROM MINERAL SOLIDS
4027731 - METHODS OF AND APPARATUS FOR HYDROCARBON RECOVERY

PHILLIPS PETROLEUM COMPANY
3488092 - METHOD FOR PRODUCING ACID-GAS WELL CONTAINING SULFUR
3498887 - RECOVERY OF SULFUR AND HYDROGEN SULFIDE FROM ADMIXTURE WITH SOLVENT FROM GAS WELL BY PLURAL STAGE DISTILLATION OF SOLVEN T
3531160 - PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT
3603095 - METHOD OF RECOVERING STORAGE VOLUME IN AN UNDERGROUND CAVERN

PPG INDUSTRIES CANADA LTD.
4007964 - PREFERENTIAL SOLUTION MINING PROCESS

PPG INDUSTRIES INC.
3433530 - METHOD OF SOLUTION MINING POTASSIUM CHLORIDE
3768865 - PROCESS FOR THE DISPOSAL OF SALT SOLUTIONS CONTAMINATED WITH AZIDE

ROAN SELECTION LIMITED
3455679 - BACTERIAL LEACHING OF ORES WITH AN ALKALINE MATRIX

SHELL OIL COMPANY
3432205 - SULFUR STEAM DRIVE
3455383 - METHOD OF PRODUCING FLUIDIZED MATERIAL FROM A SUBTERRANEAN FORMATION
3501201 - METHOD OF PRODUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION
3502372 - PROCESS OF OIL
3572838 - RECOVERY OF ALUMINUM COMPOUNDS AND OIL FROM OIL SHALE FORMATIONS
3586378 - METHOD FOR RECOVERING SALT FROM A SUBSURFACE EARTH FORMATION BY SOLUTION MINING
3596992 - METHOD FOR RECOVERING SALT FROM A SUBSURFACE EARTH FORMATION
3700280 - METHOD OF PRODUCING OIL FROM AN OIL SHALF FORMATION CONTAINING NAHCOLITE AND DAWSONITE
3739851 - METHOD OF PRODUCING OIL FROM AN OIL SHALE FORMATION
3759328 - LATERALLY EXPANDING OIL SHALE PERMEABILIZATION
3759574 - METHOD OF PRODUCING HYDROCARBONS FROM AN OIL SHALE FORMATION
3779601 - METHOD OF PRODUCING HYDROCARBONS FROM AN OIL SHALE FORMATION CONTAINING NAHCOLITE
3779602 - PROCESS FOR SOLUTION MINING NAHCOLITE
3792902 - METHOD OF PREVENTING PLUGGING OF SOLUTION MINING WELLS
3880238 - SOLVENT/NON-SOLVENT PYROLYSIS OF SUBTERRANEAN OIL SHALE
3888307 - HEATING THROUGH FRACTURES TO EXPAND A SHALE OIL PYROLYZING CAVERN
3894769 - RECOVERING OIL FROM A SUBTERRANEAN CARBONACEOUS FORMATION
3945679 - SUBTERRANEAN OIL SHALE PYROLYSIS WITH PERMEATING AND CONSOLIDATING STEPS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING
(CONTINUED)

SHELL OIL COMPANY
3957306 - EXPLOSIVE-AIDED OIL SHALE CAVITY FORMATION
3967853 - PRODUCING SHALE OIL FROM A CAVITY-SURROUNDED CENTRAL WELL
4026359 - PRODUCING SHALE OIL BY FLOWING HOT AQUEOUS FLUID ALONG VERTICALLY VARIED PATHS WITHIN LEACHED OIL SHALE
4032193 - COAL DISAGGREGATION BY BASIC AQUEOUS SOLUTION FOR SLURRY RECOVERY

SOLVAY + CIE
3914945 - PROCESS FOR DISPOSING OF THE EFFLUENTS FROM THE DISTILLERS OF AMMONIA-SODA PLANTS

SYRACUSE UNIVERSITY RESEARCH CORPORATION
3850477 - CHEMICAL COMMINUTION AND MINING OF COAL
3918761 - CHEMICAL COMMINUTION OF COAL AND REMOVAL OF ASH INCLUDING SULFUR IN INORGANIC FORM THEREFROM
4130164 - PROCESS FOR COAL GASIFICATION

TEXACO EXPLORATION CANADA LTD.
3951457 - HYDRAULIC MINING TECHNIQUE FOR RECOVERING BITUMEN FROM TAR SAND DEPOSIT

TEXACO INC.
3909422 - METHOD FOR REMOVING ELEMENTAL SULFUR IN SOUR GAS WELLS
3978926 - RECOVERY OF BITUMENS BY IMBIBITION FLOODING

TEXAS GULF, INC.
3442553 - SLURRY MINING OF CARNALLITE

TRW INC.
4059308 - PRESSURE SWING RECOVERY SYSTEM FOR OIL SHALE DEPOSITS
4065183 - RECOVERY SYSTEM FOR OIL SHALE DEPOSITS
4083604 - THERMOMECHANICAL FRACTURE FOR RECOVERY SYSTEM IN OIL SHALE DEPOSITS

UNION CARBIDE CORPORATION
3708206 - PROCESS FOR LEACHING BASE ELEMENTS, SUCH AS URANIUM ORE, IN SITU

UNION OIL COMPANY OF CALIFORNIA
4105253 - PROCESS FOR RECOVERY OF MINERAL VALUES FROM UNDERGROUND FORMATIONS

UNITED STATES OF AMERICA, ATOMIC ENERGY COMMISSION
3545964 - GOLD RECOVERY PROCESS
3823981 - SITU LEACHING SOLVENT EXTRACTION-PROCESS

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3915499 - ACID PRE-TREATMENT METHOD FOR IN SITU ORE LEACHING
4017119 - METHOD FOR RUBBLIZING AN OIL SHALE DEPOSIT FOR IN SITU RETORTING

UNITED STATES OF AMERICA HEALTH EDUCATION AND WELFARE, MESNE
4113314 - WELL PERFORATING METHOD FOR SOLUTION WELL MINING

UNITED STATES OF AMERICA, INTERIOR
3508613 - CHEMICAL DISAGGREGATION OF ROCK CONTAINING CLAY MINERALS
3890007 - CHEMICAL MINING OF COPPER PORPHYRY ORES
3912330 - CHEMICAL MINING OF COPPER PORPHYRY ORES
4080419 - FOAM INJECTION LEACHING PROCESS FOR FRAGMENTED ORE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES STEEL CORPORATION
3860289 - PROCESS FOR LEACHING MINERAL VALUES FROM UNDERGROUND FORMATIONS IN SITU
4054320 - METHOD FOR THE REMOVAL OF RADIOACTIVE WASTE DURING IN-SITU LEACHING OF URANIUM
4082358 - IN SITU SOLUTION MINING TECHNIQUE

UNIVERSITY OF UTAH
3868439 - METHOD OF INCREASING COPPER PRODUCTION

WINTERSHALL AKTIENGESELLSCHAFT
3695711 - METHOD OF RECOVERING UNDERGROUND DEPOSITS OF SOLUBLE MINERALS, AND APPARATUS FOR CARRYING OUT THE METHOD

W. R. GRACE + CO.
3437379 - PROCESS FOR MINING AND REFINING PHOSPHORUS
3512942 - APPARATUS FOR MINING AND REFINING PHOSPHORUS

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
AOAMSON	JAMES	SIONEY	539-47TH AVE. SW.	CALGARY		CA
4109715 - SYSTEM AND APPARATUS FOR EXTRACTING OIL AND THE LIKE FROM TAR SANOS IN SITU						
CARPENTER	NEIL	L.	RTE. 1, BOX 246J2	KERRVILLE	TX	78028
4071278 - LEACHING METHODS AND APPARATUS						
COURSEN	DAVIO	LINN	R.O. 2, 278-T	MERCERSBURG	PA	17236
3999803 - IN SITU LEACHING OF EXPLOSIVELY FRACTURED ORE BODIES						
DARRAH	ROBERT	M.	P.O. BOX "5" COOL	CA	95	
4056261 - RECOVERY OF GOLD AND SILVER FROM MINE-RUN DUMPS OR CRUSHEO ORES USING A PORTABLE ION-EXCHANGE CARBON PLANT						
FISHER	CHARLES	B.	2850 HILL PARK ROAO	MONTREAL, QUEBEC		CA
3988036 - ELECTRIC INOUCTION HEATING OF UNDERGROUNO ORE OEPOSITS						
FISHER	SIONEY	T.	53 MORRISON AVE.	MONTREAL, QUEBEC		CA
3988036 - ELECTRIC INOUCTION HEATING OF UNOERGROUNO ORE OEPOSITS						
GIRARD	LUCIEN	III	PRESCOTT RO.	BOXBORO	MA	01719
3865435 - STIMULATION OF RECOVERY FROM UNDERGROUND DEPOSITS						
GOODMAN	CLARK		95 ANTIQUA COURT	CORONAOO	CA	92118
4071278 - LEACHING METHOOS ANO APPARATUS						
HARD	ROBERT	A.		STILL RIVER	MA	01467
3865435 - STIMULATION OF RECOVERY FROM UNDERGROUND OEPOSITS						
HENOERSON	JOHN	KELLER	4012 E. 41 PLACE	TULSA	OK	74135
3941422 - METHOD OF INTERCONNECTING WELLS FOR SOLUTION MINING						
HUMMEL	THEOOORE	W.	187 MAPLEWOOO AVE.	ROCHESTER	NY	14613
3865580 - COPPER RECOVERY PROCESS						
KUBE	WOLFRAM	H.	4093 S. ROSEMARY WAY	OENVER	CO	80237
3953073 - PROCESS FOR THE SOLUTION MINING OF SUBTERRANEAN SODIUM BICARBONATE BEARING ORE BOOIES						
LUKES	JEROME	A.	1539 - 33RO ST.	OGOEN	UT	84403
4072472 - PROOUCTION OF HIGH PURITY SALT FROM HIGH SULFATE SALT OEPOSITS						
SAOAN	ABRAHAM		4353 OIANA WAY	SALT LAKE CITY	UT	84117
3966541 - CONCENTRATION OF UNDERGROUNO BRINES IN SITU BY SOLAR EVAPORATION						
SAREEN	SARVAJIT	S.	24 CONCORO AVE.	CAMBRIDGE	MA	02138
3865435 - STIMULATION OF RECOVERY FROM UNOERGROUNO DEPOSITS						
SCHROY	PAUL	C.	336 YARMOUTH	ROCHESTER	NY	14610
3865580 - COPPER RECOVERY PROCESS						
VON HIPPEL	HANS	JOACHIM	LATE OF P.O. OBERSTENWEILER	OBERSTENWEILER		OT
3865186 - METHOO OF AND SYSTEM FOR GASIFYING UNOERGROUNO OEPOSITS OF COAL						
VON HIPPEL	MILA			OBERSTENWEILER		OT
3865186 - METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUNO OEPOSITS OF COAL						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN OATABASE

3436213 - METHOO FOR RECOVERING METALS FROM SEA WATER
3472553 - METHOD OF AND APPARATUS FOR EXTRACTING BITUMEN
3497335 - UNOERGROUND GASIFICATION OF COAL
3498674 - MINING METHOO ANO APPARATUS
3542431 - BACTERIOLOGICAL MINING OF SULPHUR BEARING DEPOSITS
3640579 - IN SITU PRESSURE LEACHING METHOO
3679264 - GEOTHERMAL IN SITU MINING ANO RETORTING SYSTEM
3753594 - METHOD OF PROOUCING HYOROCARBONS FROM AN OIL SHALE FORMATION CONTAINING HALITE
3792903 - URANIUM SOLUTION MINING PROCESS
3819231 - ELECTROCHEMICAL METHOO OF MINING

3086760	3088717	3096969	3130960	3131914	3132852	3135501	3148000	3157231	3184287	3205012	3205013
3215471	3236564	3254921	3262741	3264099	3271962	3277654	3278232	3278233	3278234	3284137	3297362
3309140	3309141	3326606	3339978	3339979	3341252	3347595	3348883	3353870	3355212	3359037	3366419
3370887	3374633	3386768	3387888	3391962	3393733	3400980	3402965	3402966	3402967	3405974	3407003
3407004	3410604	3415573	4123106								

I.B. IN SITU CONVERSION: WELLS
3. RECOVERY OF SOLID HYDROCARBONS OR OTHER VALUABLE MATERIAL WITH DESIRED LIQUID OR GASEOUS HYDROCARBONS

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,132,448	Chevron Research Company: Method Of Recovering Coal In Aqueous Slurry Form
4,134,618	Atlantic Richfield Company: Restoration Of A Leached Underground Reservoir
4,137,720	Robert W. Rex, 2780 Casalero Dr., La Habra, CA 90631: Use Of Calcim Halide-Water As A Heat Extraction Medium For Energy Recovery From Hot Rock Systems
4,140,346	Shell Oil Company: Cavity Mining Minerals From Sub-Surface Deposit
4,155,982	Wyoming Mineral Corporation: In Situ Carbonate Leaching And Recovery Of Uranium From Ore Deposits
4,163,580	TRW, Inc.: Pressure Swing Recovery System For Mineral Deposits

II. A. IN VITRO CONVERSION: OBTAINING LIQUID HYDROCARBONS

1. PROCESSES

This profile includes thermolytic distillation and liquid extraction processes for the conversion of solid carbonaceous material, such as coal (208/8-10) or oil shale (208-11R & LE), to liquids, e.g. mineral oils, such as natural petroleum, asphalt, tars, pitches and waxes which are predominately mixtures of hydrocarbons. Also included (Class 201) are processes for the thermolytic distillation of solid carbonaceous material to form a mixture of a solid carbonaceous residue material together with vaporized material which is usually condensed to a liquid.

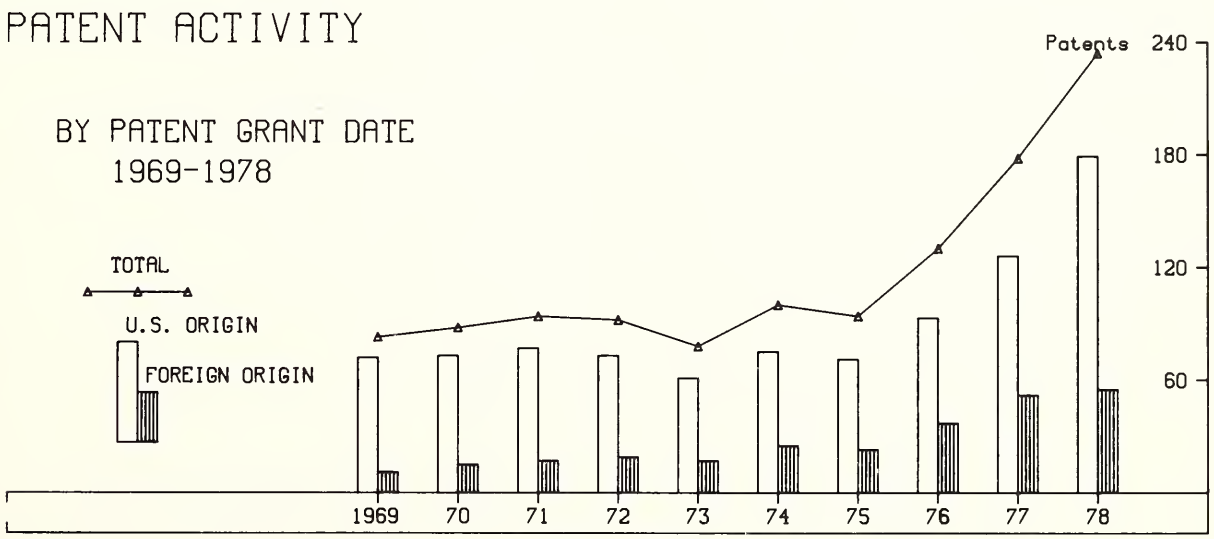
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

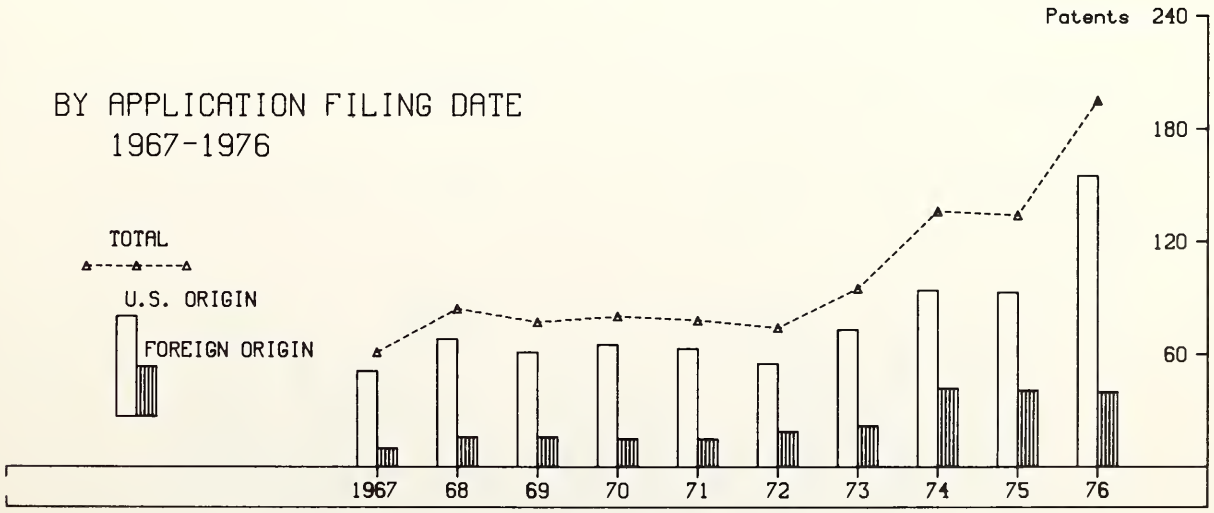
Class 201, All Subclasses

Class 208, Subclasses 8-11R

ACTIVITY INDICES (1976-1978)

GROWTH	46.3%
FOREIGN SHARE	26.6%
CORPORATE OWNED	83.2%
GOVERNMENT OWNED	3.3%
U.S. OWNED OF FOREIGN	4.2%





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	81	38	39	25	36	83	88	94	92	78	100	94	130	178	234	1390
U.S. ORIGIN	66	33	34	22	31	72	73	77	73	61	75	71	93	126	179	1086
FOREIGN ORIGIN	15	5	5	3	5	11	15	17	19	17	25	23	37	52	55	304
GERMANY	5	1	3		2	5	3	6	10	8	10	7	12	14	16	102
CANADA	7	1	1	2	3	2	3	8	2	3	6	4	10	9	11	72
JAPAN							5	2	2	3	4	7	6	14	14	57
UNITED KINGDOM		2	1	1			1	1	1		2		5	3	8	25
FRANCE	1					1			1		1		1	2	2	9
U.S.S.R.							2		1		1		1	1	1	7
NETHERLANDS		1				1						2	1	1		6
SOUTH AFRICA									1					3		4
SWEDEN	1											1		2		4
ITALY														2	1	3
INDIA										2						2
DENMARK	1									1						2
BRAZIL												1		1		2
BELGIUM						1	1									2
AUSTRALIA												1	1			2
RHODESIA															1	1
PORTUGAL															1	1
CZECHOSLOVAKIA									1							1
PHILIPPINES											1					1
MEXICO						1										1
U.S. ORIGIN	66	33	34	22	31	72	73	77	73	61	75	71	93	126	179	1086
U.S. CORP. OWNED	59	28	29	17	26	52	58	64	52	52	62	52	62	98	159	870
U.S. GOVT. OWNED				3		4	2	4	2	2	4	6	7	4	1	39
U.S. INDIV. OWNED	6	5	4	2	4	15	7	6	19	5	9	9	20	22	17	150
FOREIGN OWNED	1		1		1	1	6	3		2		4	4	2	2	27
FOREIGN ORIGIN	15	5	5	3	5	11	15	17	19	17	25	23	37	52	55	304
U.S. OWNED	7	1		1	1	4	2	5	2		3	3	3		3	35
FOREIGN OWNED	8	4	5	2	4	7	13	12	17	17	22	20	34	52	52	269
FOREIGN CORP.	7	2	2	2	2	7	11	11	12	15	17	17	31	48	39	223
FOREIGN GOVT.		2	1								1	1			6	11
FOREIGN INDIV.	1		2		2		2	1	5	2	4	2	3	4	7	35

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

- NUMBER OF PATENTED APPLICATIONS- - - - - - - - - - - - - - - - - - - -

	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	41	37	53	61	84	77	80	78	74	95	136	134	195	86	1	1232
U.S. ORIGIN	33	29	48	51	68	61	65	63	55	73	94	93	155	64	1	953
FOREIGN ORIGIN	8	8	5	10	16	16	15	15	19	22	42	41	40	22		279
GERMANY	3	2	1	3	3	11	7	4	9	7	14	7	15	7		93
CANADA	3	2	2	2	7	4	1	4	2	4	10	9	6	7		63
JAPAN		1	1	2	4		2	4	2	7	7	14	9	4		57
UNITED KINGDOM	1				1	1		1	2		6	3	4	3		22
FRANCE			1				1		1	1	1	2	1			8
U.S.S.R.				2			2				1	1	1			7
NETHERLANDS		1							1	2	1					5
SOUTH AFRICA				1								2	1			4
SWEDEN										1		1	1			3
ITALY												1	2			3
INDIA								2								2
DENMARK							1									1
BRAZIL									1			1				2
BELGIUM		1			1											2
AUSTRALIA									1		1					2
RHODESIA											1					1
PORTUGAL														1		1
CZECHOSLOVAKIA		1														1
PHILIPPINES							1									1
MEXICO	1															1
U.S. ORIGIN	33	29	48	51	68	61	65	63	55	73	94	93	155	64	1	953
U.S. CORP. OWNED	23	23	41	39	56	46	50	52	41	63	59	71	135	54	1	754
U.S. GOVT. OWNED	1	2	2	2	2	4	3	2	4	2	7	5	3			39
U.S. INDIV. OWNED	9	3	5	5	6	10	11	8	9	8	21	16	16	8		135
FOREIGN OWNED		1		5	4	1	1	1	1		7	1	1	2		25
FOREIGN ORIGIN	8	8	5	10	16	16	15	15	19	22	42	41	40	22		279
U.S. OWNED	1	2	2	2	6	1		1	3	1	5		1	2		27
FOREIGN OWNED	7	6	3	8	10	15	15	14	16	21	37	41	39	20		252
FOREIGN CORP.	5	6	2	5	10	13	11	11	14	18	34	35	34	14		212
FOREIGN GOVT.									1		1	1	1	4		8
FOREIGN INDIV.	2		1	3		2	4	3	1	3	2	5	4	2		32

II. A. IN VITRO CONVERSION - OBTAINING LIQUID HYDROCARBONS
1. PROCESSES

ASSIGNEES WITH 6 OR MORE PATENTS (1/69-12/78)

EXXON RESEARCH + ENGINEERING CO.	79
UOP INC.	36
SHELL OIL COMPANY	30
ATLANTIC RICHFIELD COMPANY	27
OCCIDENTAL PETROLEUM CORPORATION	27
GREAT CANADIAN OIL SANDS LIMITED	27
TEXACO INC.	27
HYDROCARBON RESEARCH INC.	24
MOBIL OIL CORPORATION	24
UNITED STATES OF AMERICA, INTERIOR	22
PHILLIPS PETROLEUM COMPANY	21
KOPPERS COMPANY INC.	20
BERGWERKSVERBAND GMBH	16
GULF RESEARCH + DEVELOPMENT COMPANY	15
SUN OIL COMPANY OF PENNSYLVANIA	14
STANDARD OIL COMPANY	14
LUMMUS COMPANY	14
MARATHON OIL COMPANY	13
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	13
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	12
COAL INDUSTRY (PATENTS) LIMITED	12
KERR-MCGEE CORPORATION	12
CANADA-CITIES SERVICE LTD.	12
UNION OIL COMPANY OF CALIFORNIA	11
UNITED STATES STEEL CORPORATION	11
OIL SHALE CORPORATION	10*
DR. C. OTTO COMP. G.M.B.H.	9
GREAT LAKES CARBON CORPORATION	9
AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)	8
INSTITUTE OF GAS TECHNOLOGY	8
CITIES SERVICE COMPANY	8
CONTINENTAL OIL COMPANY	8
ALLIED CHEMICAL CORPORATION	8
FIRMA CARL STILL	8*
PARAHO CORPORATION	7
PEABODY COAL COMPANY	7
CONSOLIDATION COAL COMPANY	7
HEINRICH KOPPERS GMBH	7*
SALEM CORPORATION	6
NIPPON KOKAN KABUSHIKI KAISHA	6
BATTELLE MEMORIAL INSTITUTE	6
MCDOWELL-WELLMAN ENGINEERING COMPANY	6
CHEVRON RESEARCH COMPANY	6

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AB MOTALA VERKSTAO
3886873 - METHOD IN THE DESTRUCTION OF WASTE BY GASIFICATION ANO COMBUSTION

AGENCE NATIONALE OE VALORISATION DE LA RECHERE (ANVAR)
3557020 - HCL OR HBR VAPOR CARBONIZATION OF VEGETABLE MATERIAL IN THE MANUFACTURE OF ACTIVATED CARBON
3838988 - METHOO OF MANUFACTURING BRIQUETS ANO COKE IN THE MOLOED FORM WITH ASPHALT AS THE BINDER
3843339 - PROCESS FOR FLUIOIZEO COMBUSTION OF PLASTICS
3910849 - METHOD FOR MANUFACTURE OF ACTIVATED CARBON ANO APPARATUS THEREFOR
4029550 - PROCESS FOR THE DRY OISTALLATION OF RUBBER
4038172 - METHOO FOR REMOVAL OF OXYGEN FROM OXYGEN-CONTAINING COMPOUNDS
4040941 - PROCESS FOR LIQUEFYING COAL
4082615 - THERMAL DECOMPOSITION PROCESS AND APPARATUS FOR ORGANIC SOLIO MATERIALS

AIRCO INC.
3642962 - METHOO OF INHIBITING PUFFING IN THE MANUFACTURE OF GRAPHITE ARTICLES FROM SULFUR-CONTAINING PETROLEUM COKE

AIR PROOUCTS + CHEMICALS, INC.
4075082 - PROCESS FOR HYDROOESULFURIZATION ANO LIQUEFACTION OF CARBONACEOUS STOCKS USING SUSPENDEO CATALYST

AKTIEBOLAGET ELECTROLUX
4038184 - METHOD OF PROCESSING WASTE ON SHIPS ANO THE LIKE ANO ARRANGEMENT FOR CARRYING OUT THE METHOD

AKZO N.V.
3886088 - PROCESS FOR THE PREPARATION OF A GRANULAR ACTIVATEO CARBON, ANO GRANULAR ACTIVATED CARBONS PRODUCEO THEREBY

ALCAN RESEARCH ANO OEVELOPMENT, LIMITEO
3888621 - MONITORING ANO CONTROLLING KILN OPERATION IN CALCINATION OF COKE
3966560 - METHOO OF CALCINING COKE IN A ROTARY KILN
4012202 - PYROSCRUBBER
4022569 - CALCINATION OF COKE

ALKEM ALPHA-CHEMIE UNO-METALLURGIE G.M.B.H.
3776856 - PROCESS FOR THE WET CHEMICAL COMBUSTION OF ORGANIC MATERIAL

ALLIED CHEMICAL CORPORATION
3432398 - CHARGING COKE OVEN WITH HOT COARSELY COMMINUTEO COAL
3438867 - OISENTRAINMENT OF COAL PARTICLES IN PNEUMATICALLY CHARGEO COKE OVENS
3454426 - GAS JET CLEANING OF COKE OVEN OOORS AND JAMBS
3457141 - CHARGING OF PREHEATED COAL INTO THE COKING CHAMBERS OF A COKE OVEN BATTERY
3523065 - CHARGING OF PREHEATED COAL INTO THE COKING CHAMBERS OF A COKE OVEN BATTERY
3738929 - HYOROCARBON EXTRACTION
3761360 - RE-ENTRAINMENT CHARGING OF PREHEATEO COAL INTO COKING CHAMBERS OF A COKE OVEN BATTERY
3964976 - PROCESS FOR CLEANING COKE OVEN GAS OFFTAKES

ALLIS-CHALMERS CORPORATION
3560368 - TRAVELING GRATE METHOO FOR THE RECOVERY OF OIL FROM SHALE
3560369 - RETORTING OIL SHALE INCLUOING AGGLOMERATEO FINES
3644193 - PROCESS AND APPARATUS FOR THE RECOVERY OF OIL FROM SHALE BY INDIRECT HEATING

AMERICAN GAS ASSOCIATION, INC.
3922215 - PROCESS FOR PROOUCTION OF HYDROCARBON LIQUIOS ANO GASES FROM OIL SHALE
3929615 - PROOUCTION OF HYDROCARBON GASES FROM OIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AMERICAN MINECHEM CORPORATION
4082515 - COKE OVEN SYSTEM AND AGGLOMERATING CARRYOVER FINES THEREIN

AMERICAN WAGNER-BIRO COMPANY, INC.
3697381 - METHOD AND APPARATUS FOR POLLUTION-FREE CHARGING OF COKE OVENS
3728230 - INDIRECTLY HEAT EXCHANGING PLURAL GAS STREAMS FOR DRY QUENCHING HOT COKE AND DRYING COAL
3843458 - COAL TREATING METHOD AND APPARATUS FOR COKE PLANTS
3888742 - POLLUTION-FREE COAL-PREHEATING WITH WASTE HEAT FROM DRY COKE-QUENCHING

ARTHUR D. LITTLE INC.
4039424 - PROCESS FOR PRODUCING FLUID FUEL FROM COAL
4039426 - PROCESS FOR PRODUCING FLUID FUEL FROM COAL

ARTHUR G. MCKEE + COMPANY
4097361 - PRODUCTION OF LIQUID AND GASEOUS FUEL PRODUCTS FROM COAL OR THE LIKE

ASHLAND OIL INC.
3533938 - JET FUEL FROM BLENDED CONVERSION PRODUCTS
3725246 - HYDROGEN PRODUCTION AND UTILIZATION

ATLANTIC RICHFIELD COMPANY
3454363 - METAL CONTAMINANT REMOVAL FROM SOLID CARBONACEOUS MATERIALS
3503866 - PROCESS AND SYSTEM FOR PRODUCING SYNTHETIC CRUDE FROM COAL
3503867 - PROCESS AND SYSTEM FOR PRODUCING SYNTHETIC CRUDE FROM COAL
3617466 - GAS COMBUSTION RETORT PROCESS
3617467 - PROCESSES FOR RETORTING OIL SHALE
3617468 - PROCESS FOR REMOVING THE HYDROCARBON CONTENT OF CARBONACEOUS MATERIALS
3635814 - CATALYTIC COAL CONVERSION PROCESS
3654141 - CATALYTIC CRACKING OF SHALE OIL OVER ZEOLITE CATALYST
3660054 - COAL UPGRADING
3660267 - COAL PROCESSING
3660269 - COAL PROCESSING
3661774 - SEPARATION OF SOLIDS FROM A LIQUID
3663420 - COAL PROCESSING
3738931 - METHOD FOR TREATING SYNTHETIC CRUDE OIL FOR POUR POINT REDUCTION
3745108 - COAL PROCESSING
3803021 - SEPARATING RETORTED SHALE FOR RECYCLED HEAT-CARRYING PELLETS
3803022 - RETORTING SYSTEM
3808120 - TAR SANDS BITUMEN FROTH TREATMENT
3841993 - RETORTING OF OIL SHALE WITH SPECIAL HEAT CARRIERS
3841994 - RETORTING OIL SHALE WITH SPECIAL PELLETS AND SUPPLEMENTAL DEPOSITION
3844929 - RETORTING OIL SHALE WITH SPECIAL PELLETS
3844930 - RETORTING OIL SHALE WITH SPECIAL PELLETS AND STEAM STRIPPING
3850739 - RETORTING OIL SHALE WITH SPECIAL PELLETS AND PRECOKING STAGE
4051014 - PROCESS FOR TREATING SULFUR-CONTAINING HYDROCARBON FEEDSTOCKS TO PRODUCE HIGH YIELD COKE
4097244 - PROCESS FOR REMOVING SULFUR FROM COAL
4105416 - PROCESS FOR REMOVING SULFUR FROM COAL
4118309 - SEPARATION AND RECOVERY OF HEAT CARRIERS IN AN OIL SHALE RETORTING PROCESS

BABCOCK + WILCOX CO.
3454383 - GASIFICATION METHOD AND APPARATUS

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

BAMAG VERFAHRENSTECHNIK GMBH
4017272 - PROCESS FOR GASIFYING SOLIO CARBONACEOUS FUEL

BARNEBEY-CHENEY CO.
3525674 - SUBMERGEO COMBUSTION CARBONIZATION
4038154 - PILE FURNACE

BASF AKTIENGESELLSCHAFT
3458588 - REGENERATING NAPHTHALENE MIXTURES CONTAINING CARBON BLACK WITH SIMULTANEOUS RECOVERY OF GLOBULAR PETROLEUM COKE

BATTELLE DEVELOPMENT CORPORATION
4092125 - TREATING SOLIO FUEL
4095955 - FUEL SEPARATION PROCESS

BATTELLE MEMORIAL INSTITUTE
4010089 - REACTING COAL
4012314 - TREATING COAL LIQUEFACTION PROOUCT OIL
4044904 - METHOD OF FEEDING PARTICLES FROM A FIRST REGION TO A SECONO REGION
4067795 - PROCESS FOR COAL LIQUEFACTION USING ELECTROOEPOSITED CATALYST
4090944 - PROCESS FOR CATALYTIC OEPOLYMERIZATION OF COAL TO LIQUIO FUEL
4121910 - TREATING CARBONACEOUS MATERIAL

B.D.F. LTD.
4089658 - COAL EXTRACTION ANO FUEL AOOITIVE MAOE THEREFROM

BECHTEL INTERNATIONAL CORP.
3850738 - BITUMINOUS COAL LIQUEFACTION PROCESS

BENNETT ENGINEERING COMPANY
3576734 - PROCESS FOR PRODUCTION OF SYNTHETIC CRUOE OIL FROM LOW TEMPERATURE COAL TARS

BERGWERKSVERBANO GMBH
3444048 - CONTINUOUS COKING APPARATUS
3475278 - METHOO FOR PROOUCING COKE BRIQUETTES
3623999 - PROCESS OF MAKING A BALL-SHAPED AOSORPTION COKE
3661722 - APPARATUS FOR CARBONIZING CARBONACEOUS MATERIALS WITH OIRECT CONTACT HEAT EXCHANGE MATERIAL
3700563 - METHOD OF REACTIVATING SPENT ACTIVATEO COAL
3728229 - PROCESS FOR THE MANUFACTURE OF ABRASION-RESISTANT SHAPEO COKE
3800428 - PROCESS FOR COOLING HOT BRIQUETTES
3970523 - PROCESSES OF PROOUCING COKES OF LARGE LUMP SIZE ANO IMPROVEO STRENGTH FROM BITUMINOUS COALS
4024022 - METHOD OF INHIBITING OUST FORMATION WHEN FEEDING COAL INTO COKING CHAMBERS
4030983 - METHOD OF RESTRICTING DUST OEVELOPMENT WHEN FEEOING COAL INTO COKE OVENS
4055471 - METHOD OF RESTRICTING THE FORMATION OF DUST WHEN FEEOING COAL INTO COKE OVENS
4064017 - METHOD OF OPERATING COKE OVENS
4080181 - GAS GENERATOR
4086143 - COKING METHOD AND ARRANGEMENT
4086144 - PROCESS ANO APPARATUS FOR THE SEPARATION OF FLOAT TARS IN THE TAR SEPARATOR OF A COKING INSTALLATION
4102751 - COKE OVEN BATTERY WITH CONTROL MEANS FOR CHANGING THE HEAT SUPPLY

BETHLEHEM STEEL CORPORATION
3431180 - IMMERSION QUENCHING APPARATUS
3756791 - METHOD FOR SIMULTANEOUSLY CALCINING ANO OESULFURIZING AGGLOMERATES OF COAL ANO/OR COAL DERIVATIVES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

BETHLEHEM STEEL CORPORATION (CONTINUED)
3821088 - COKE OVEN PUSHER MACHINE LEVELER BAR SEAL
4039391 - COKE OVEN BATTERY AND METHOD FOR OPERATION ON A SLOW-DOWN BASIS

BLACK CLAWSON COMPANY
3714038 - PROCESS AND PRODUCT FOR CONVERTING ORGANIC MATERIALS BY PYROLYSIS OR HYDROGENATION

BLUE EMBER FLAME CORPORATION
3933618 - GAS GENERATION APPARATUSES AND PROCESSES

BRICMONT + ASSOCIATES, INC.
3734834 - APPARATUS AND METHOD FOR APPLYING A FOAM COATING TO EJECTED HOT COKE

BRITISH STEEL CORPORATION
4097304 - CLEANING COKE OVEN DOORS
4105503 - METHOD AND APPARATUS FOR EMISSION CONTROL OF BY-PRODUCT COKE OVENS

BRITISH TITAN PRODUCTS COMPANY LIMITED
3522016 - SCRAPER APPARATUS FOR REACTION CHAMBER

BROKEN HILL PROPRIETARY COMPANY LIMITED
3921307 - FLUIDIZED BED APPARATUS AND METHODS

BUTTNER-SCHILDE-HAAS AG
4053364 - DRYING AND PREHEATING OF MOIST COAL AND QUENCHING OF THE FORMED COKE

BYRON JACKSON INC.
3440096 - METHOD OF REMOVING SOLID PROPELLANT

CALGON CORPORATION
3876505 - MANUFACTURE OF ACTIVATED CARBON FROM SIZED COAL
4014817 - MANUFACTURE OF ACTIVATED CARBON FROM SIZED COAL

CALIFORNIA INSTITUTE OF TECHNOLOGY
4081250 - COAL DESULFURIZATION PROCESS

CANADA-CITIES SERVICE LTD.
3619406 - CONTROL OF SOLIDS IN PROCESSING BITUMINOUS SAND
3623971 - USE
3656938 - TREATMENT OF BITUMINOUS SANDS FOR RECOVERY OF HEAVY METALS THEREFROM
3726786 - PROCESS FOR INTEGRATION OF EXTRACTION PROCESSING STREAMS
3738930 - SECONDARY FROTH WASH
3779902 - PREPARATION OF MINERAL FREE ASPHALTENES
3784464 - PROCESS FOR WASHING SECONDARY SEPARATOR FROTH TO RECOVER BITUMEN
3796652 - THERMAL DEHYDRATION OF BITUMEN FROTH
3847789 - TWO STAGE SEPARATION SYSTEM
3864251 - TREATMENT OF MIDDLINGS STREAM FROM HOT WATER PROCESS FOR RECOVERING BITUMEN FROM TAR SAND
3869384 - TAILINGS DISPOSAL SYSTEM FOR TAR SANDS PLANT
3935076 - TWO STAGE SEPARATION SYSTEM

CANADA, HER MAJESTY THE QUEEN IN RIGHT OF, AS REPRESENTED BY
4105537 - SYSTEM FOR HANDLING THE UNDERFLOW FROM A PRIMARY SEPARATION VESSEL IN THE TAR SAND HOT WATER PROCESS
4107029 - DUAL CONTROL SYSTEM FOR TAILINGS OUTLET OF PRIMARY SEPARATION VESSEL IN THE HOT WATER PROCESS FOR BITUMINUOUS SANDS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CANADA, HER MAJESTY THE QUEEN IN RIGHT OF, AS REPRESENTED BY (CDNTINUED)
4111789 - RECDVERY OF HYDROCARBDN FROM DILUTIDN CENTRIFUGING TAILINGS
4116809 - DEAERATDR CIRCUIT FOR BITUMEN FROTH
4131535 - TREATMENT OF TUMBLER REJECT

CANADIAN PATENTS + DEVELOPMENT LIMITED
3637464 - UPGRADING CDKING CDALS AND CDKE PRDDUCTIDN
3984287 - APPARATUS FDR SEPARATING ORGANIC MATERIAL FRDM PARTICULATE TAR SANDS AND CDAL AND AGGLDMERATIDN DF THE PARTICULATE RESID UE
4029567 - SDLIDS RECDVERY FROM CDAL LIQUEFACTIDN SLURRY
4057486 - SEPARATING ORGANIC MATERIAL FRDM TAR SANDS OR DIL SHALE

CATD RESEARCH CDRPDRATIDN
4118200 - PRDCESS FOR DESULFURIZING CDAL

CAW INDUSTRIES, INC.
3893943 - NDVEL CATALYST AND PROCESS FOR PREPARING THE SAME
3951778 - METHDD DF SEPARATING BITUMIN FROM BITUMINDUS SANDS AND PREPARING DRGANIC ACIDS
4084938 - PROCESS FOR TREATING SDLID CARBDNACEDUS FOSSIL FUELS AND THE PRDDUCTS THUS PREPARED

CENTRO SPERIMENTALE METALLURGICO S.P.A.
4022668 - PROCESS FOR THE PRODUCTION OF FORMED CDKE
4056443 - CDKE PRDDUCTIDN
4108731 - CDKE PRODUCTIDN

CESKOSLDVENSKA AKADEMIE VED
3660245 - APPARATUS FOR CDNTINUOUS MANUFACTURE DF FERFURAL AND ACETIC ACID

CHEMICAL CLEANING AND EQUIPMENT SERVICE, INC.
3523825 - CLEANING COMPOSITION AND METHDD DF USING SAME

CHEMICAL CDNSTRUCTION CDRPDRATION
3824084 - PRDDUCTION OF LOW SULFUR COAL

CHEVRON RESEARCH CDMPANY
3518182 - CDNVERSIDN DF COAL TO LIQUID PRDDUCTS
3765851 - GAS PRODUCTION
4056461 - RETORTING PRDCESS UTILIZING A FLEXIBLE, HELICAL SHAPED CDNVEYDR
4069133 - APPARATUS AND PRDCESS FOR REDUCING PARTICULATES IN A VAPDROUS STREAM CONTAINING CDNDENSABLE HYDRDCARBDNS
4087347 - SHALE RETORTING PROCESS
4125453 - SPDUTED-BED SHALE RETORTING PRDCESS

CITIES SERVICE CDMPANY
3628929 - METHDD FOR RECDVERY OF CDAL ENERGY
3960700 - CDAL HYDRDGENATIDN TO PRODUCE LIQUIDS
3997423 - SHORT RESIDENCE TIME LOW PRESSURE HYDROPYRDLYSIS DF CARBDNACEDUS MATERIALS
4003820 - SHORT RESIDENCE TIME HYDROPYRDLYSIS DF CARBONACEOUS MATERIAL
4012311 - SHDRT RESIDENCE TIME LOW PRESSURE HYDROPYRDLYSIS DF CARBDNACEDUS MATERIALS
4013543 - UPGRADING SDLID FUEL-DERIVED TARS PRDDUCED BY LDW PRESSURE HYDRDPYRDLYSIS
4048053 - UPGRADING SDLID FUEL-DERIVED TARS PRDDUCED BY SHDRT RESIDENCE TIME LOW PRESSURE HYDRDPYRDLYSIS
4075081 - FLUIDIZED BED HYDRDRETDRTING DF DIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CITIES SERVICE RESEARCH AND DEVELOPMENT COMPANY
3784462 - PROCESS AND APPARATUS FOR OIL SHALE RETORTING
3972801 - OIL SHALE RETORTING

CLEAN ENERGY CORPORATION
3966582 - SOLUBILIZATION AND REACTION OF COAL AND LIKE CARBONACEOUS FEEDSTOCKS TO HYDROCARBONS AND APPARATUS THEREFOR
3966583 - COAL TREATMENT PROCESS AND APPARATUS
4104056 - ORE REDUCTION USING MOLTEN SALTS

COAL INDUSTRY (PATENTS) LIMITED
3558468 - METHOD OF EXTRACTING MATERIALS
3966584 - IMPROVEMENTS IN AND RELATING TO THE PRODUCTION OF COKE
3966585 - MANUFACTURE OF COKE FROM A COAL EXTRACT
3970541 - GAS EXTRACTION OF COAL
3997424 - HYDROGENATIVE TREATMENT OF COAL
4019975 - HYDROGENATION OF COAL
4028220 - GAS EXTRACTION OF COAL
4036731 - HYDROGENATION OF COAL
4101413 - EXTRACTION OF COAL
4105419 - FLUIDIZED BED APPARATUS
4108760 - EXTRACTION OF OIL SHALES AND TAR SANDS
4119525 - MANUFACTURE OF COKE

COALMET CORPORATION
4127390 - HYDRODESULFURIZATION OF COAL AND THE LIKE

COALTEK ASSOCIATES
4060458 - SEPARATION OF GAS FROM SOLIDS

COMBUSTION ENGINEERING INC.
3887461 - MAKING ACTIVE CARBON FROM SEWAGE SLUDGE
4069024 - TWO-STAGE GASIFICATION SYSTEM

COMBUSTION EQUIPMENT ASSOCIATES INC.
3876383 - APPARATUS UTILIZING COUNTER-CURRENT INTERACTION AND PARTICULATE FLOW REGULATION

COMPAGNIE INDUSTRIELLE DE PROCEDES + D APPLICATIONS S.A.
3840345 - SELF AGGLOMERATING FLUIDIZED BED REACTING APPARATUS

COMPAGNIE INDUSTRIELLE DE PROCEDES + D APPLICATIONS S.A.
4088745 - SELF-AGGLOMERATING FLUIDIZED BED REACTING PROCESS

CONSOLIDATED COAL COMPANY
3671401 - METHOD OF CALCINING AND DESULFURIZING CARBONACEOUS CONTIGUOUS BED OF AGGLOMERATES WITH PARTICULATE HEAT CARRIERS

CONSOLIDATION COAL COMPANY
3562783 - PROCESS FOR MAKING AGGLOMETATES FROM COAL USING COAL EXTRACT AS BINDER
3692505 - FIXED BED COAL GASIFICATION
3748254 - CONVERSION OF COAL BY SOLVENT EXTRACTION
3791956 - CONVERSION OF COAL TO CLEAN FUEL
3920418 - PROCESS FOR MAKING LIQUID AND GASEOUS FUELS FROM CAKING COALS
4008054 - PROCESS FOR MAKING LOW-SULFUR AND LOW-ASH FUELS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CONSOLIDATION COAL COMPANY (CONTINUED)
4030982 - PROCESS OF MAKING FORMCOKE FROM NON-CAKING OR WEAKLY CAKING COALS

CONTINENTAL ENERGY CORPORATION, MESNE
3855071 - CARBONIZATION APPARATUS HAVING LOUVERS ON INTERNAL DUCT

CONTINENTAL OIL COMPANY
3480082 - IN SITU RETORTING OF OIL SHALE USING CO/2\ CARRIER
3565827 - PREPARATION OF ACTIVATED CARBON IN SERIALLY DISPOSED FLUIDIZED ZONES
3619405 - GAS COMBUSTION OIL SHALE RETORTING WITH EXTERNAL INDIRECT GAS HEAT EXCHANGE
3723291 - PROCESS FOR DESULFURIZING COKE
3832306 - PROCESS FOR THE PREPARATION OF ACTIVE CARBON FROM HALOHYDROCARBONS
4075080 - COAL LIQUEFACTION PROCESS WITH REMOVAL OF AGGLOMERATED INSOLUBLES
4081400 - REGENERATION OF ZINC HALIDE CATALYST USED IN THE HYDROCRACKING OF POLYNUCLEAR HYDROCARBONS
4094766 - COAL LIQUEFACTION PRODUCT DEASHING PROCESS

CONTINENTAL ORE CORPORATION
3449214 - FLUORSPAR-FLUX ADDITIVE IN A COKING OPERATION

COPELAND SYSTEMS INCORPORATED
3862909 - FLUIDIZED BED AUTOGENOUS COMBUSTION AND PYROLYSIS OF AQUEOUS EFFLUENTS TO PREPARE ACTIVATED CARBON

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
3773904 - PROCESS FOR THE PRODUCTION OF CARBON BLACK FROM COAL
3775286 - HYDROGENATION OF COAL

CPC INTERNATIONAL INC.
3816338 - PROCESS FOR THE REACTIVATION OF POWERED CARBON
3852038 - APPARATUS FOR THE REACTIVATION OF POWDERED CARBON

CREATIVE ENTERPRISES INTERNATIONAL
3562115 - FLUIDIZED BED RETORT SURROUNDED BY A FLUIDIZED SAND HEAT EXCHANGER

CRYO-MAID INC.
4052293 - METHOD AND APPARATUS FOR EXTRACTING OIL FROM HYDROCARBONACEOUS SOLID MATERIAL

DAIKYO OIL COMPANY LTD.
3957620 - PROCESS FOR TREATING HEAVY OIL

DECO INDUSTRIES, INC.
4077868 - METHOD FOR OBTAINING HYDROCARBON PRODUCTS FROM COAL AND OTHER CARBONACEOUS MATERIALS

DECO INDUSTRIES
4030984 - SCRAP-TIRE FEEDING AND COKING PROCESS

DESTRUGAS A/S
3744439 - METHOD OF SUPPLYING REFUSE TO A GAS PRODUCING CHAMBER FOR DISPOSAL OF THE REFUSE AND A REFUSE DISPOSAL PLANT COMPRISING A GASIFICATION CHAMBER

DEVCO MANAGEMENT INC., MESNE
3838015 - METHOD AND APPARATUS FOR PYROLYTIC DECOMPOSITION OF TRASH

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

DIDIER ENGINEERING GMBH
3975240 - PROCESS AND SYSTEM FOR DETERMINING THE END OF A COKING PROCESS
4018655 - PROCESS FOR FEEDING COAL INTO HORIZONTAL-CHAMBER COKE-OVENS AND CHARGING TRUCK THEREFOR

DIDIER-KELLOGG INDUSTRIEANLAGENBAU GMBH
3880720 - APPARATUS FOR CHARGING COKE-OVEN CHAMBERS

DONNER-HANNA COKE CORPORATION
4113569 - COKE AIR POLLUTION CONTROL METHOD AND APPARATUS

DORR-OLIVER INCORPORATED
3904549 - FLUIDIZED BED REGENERATION OF POWDERED ACTIVATED CARBON
3926129 - EVAPORATIVE CONCENTRATION OF WASTE SLUDGES WITH INCINERATOR EXHAUST GASES

DOW CHEMICAL COMPANY
3685984 - REMOVING METAL CARBIDES FORM FURNACE SYSTEMS
4071328 - METHOD OF REMOVING SULFUR FROM COAL
4090943 - COAL HYDROGENATION CATALYST RECYCLE
4102775 - CONVERSION PROCESS FOR SOLID, HYDROCARBONACEOUS MATERIALS

DRAVO CORPORATION
3753683 - METHOD AND APPARATUS FOR CARBONIZING AND DESULFURIZING COAL-IRON COMPACTS
3886048 - DESULFURIZATION OF COAL
3959084 - PROCESS FOR COOLING OF COKE

DR. C. OTTO COMP. G.M.B.H.
3809619 - COMBINED WET AND DRY QUENCHING
3843460 - APPARATUS FOR TRANSPORTING AND QUENCHING COKE PUSHED FROM HORIZONTAL COKING CHAMBERS
3875016 - METHOD AND APPARATUS FOR CONTROLLING THE OPERATION OF REGENERATIVELY HEATED COKE OVENS
3876143 - PROCESS FOR QUENCHING HOT COKE FROM COKE OVENS
3950228 - LEVELING ARRANGEMENT FOR COKE OVENS
3951750 - APPARATUS FOR CHARGING PREHEATED COAL INTO COKE OVENS
4001092 - CHARGING CAR FOR COKE OVENS
4003803 - CONTROL SYSTEM FOR PREVENTING AN EXCESSIVE TEMPERATURE RISE IN A BATTERY OF COKE OVENS
4066420 - PROCESS FOR THE GASIFICATION OF SOLID FUELS

E. I. DU PONT DE NEMOURS AND COMPANY
3980439 - FLUIDIZING APPARATUS WITH FORAMINOUS MEMBER

ELECTRIC POWER RESEARCH INSTITUTE, INC.
4021328 - SOLIDFYING SOLVENT REFINED COAL
4111663 - REACTOR FOR SOLVENT REFINED COAL
4127475 - PROCESS FOR THE ISOLATION OF CHEMICALS FROM PROCESSED COALS

ENERGY MODIFICATION, INC.
4120664 - PRODUCTION OF LOW-SULFUR COAL POWDER FROM THE DISINTEGRATION OF COAL

ENERGY RECOVERY RESEARCH GROUP, INC.
4123332 - PROCESS AND APPARATUS FOR CARBONIZING A COMMINUTED SOLID CARBONIZABLE MATERIAL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

ENGINEERING SPECIALTIES, INC.
3893918 - METHOD FOR SEPARATING MATERIAL LEAVING A WELL

ENTOLETER, INC.
3566582 - MASS CONTACT BETWEEN MEDIA OF DIFFERENT DENSITIES

ESCHWEILER BERGWERKS VEREIN AKTIENGESELLSCHAFT
3869350 - PROCESS FOR A THERMAL PRETREATMENT OF COKING BITUMINOUS COAL
3959083 - METHOD AND APPARATUS FOR QUENCHING OF HEATED BULK MATERIALS

ESSO STANDARD SOCIETE ANONYME FRANCAISE
3480419 - GASIFICATION OF HYDROCARBONS

ETABLISSEMENT CAPITROP
4126518 - METHOD AND INCLINED CHAMBER FURNACE FOR CARBONIZING FLUENT CARBON-CONTAINING MATERIAL

EXXON RESEARCH + ENGINEERING CO.
3422000 - PHOSPHATE ADDITIVES IN A TAR SAND WATER SEPARATION PROCESS
3431197 - FLUID COKING USING EXTRANEOUS SEED COKE
3440162 - RETORTING OF OIL SHALE
3443908 - APPARATUS FOR THE PRODUCTION OF PETROLEUM COKE HAVING AN IMPROVED PRECOMBUSTOR
3475319 - RETORTING OF OIL SHALE
3480540 - PROCESS FOR HYDROFINING BITUMEN DERIVED FROM TAR SANDS
3484364 - FLUIDIZED RETORTING OF OIL SHALE
3488279 - TWO-STAGE CONVERSION OF COAL TO LIQUID HYDROCARBONS
3488280 - CATALYTIC HYDROGENATION OF COAL WITH WATER RECYCLE
3489672 - RETORTING TOTAL RAW SHALE
3514394 - CYCLIC PROCESS FOR CONVERTING COAL INTO LIQUID PRODUCTS BY USE OF FIXED CATALYTIC BEDS
3520067 - COAL DRYING
3520795 - RETORTING OF OIL SHALE
3522170 - METHOD OF HEATING FLUIDIZED BEDS
3563778 - PREPARATION OF IMPROVED ASPHALT COMPOSITION
3573194 - RETORTING OF OIL SHALE
3575847 - USE OF SPHERICAL CATALYST IN COAL EXTRACT HYDROGENATION
3600130 - DESULFURIZATION OF FLUID PETROLEUM COKE
3617513 - COKING OF
3645885 - UPFLOW COAL LIQUEFACTION
3652446 - COMBINATION PROCESS FOR LIQUEFACTION OF COAL AND CATALYTIC CRACKING OF SELECTED FRACTIONS THEREOF
3661543 - FLUID COKING PROCESS INCORPORATING GASIFICATION OF PRODUCT ORE
3687837 - COAL LIQUEFACTION SOLIDS REMOVAL
3592662 - COAL LIQUEFACTION AT STAGED TEMPERATURES
3694342 - CATALYTIC LIQUEFACTION OF COAL USING SYNTHESIS GAS
3694346 - INTEGRATED FLUID COKING/STEAM GASIFICATION PROCESS
3700583 - COAL LIQUEFACTION USING CARBON RADICAL SCAVENGERS
3702516 - GASEOUS PRODUCTS OF GASIFIER USED TO CONVEY COKE TO HEATER
3702816 - LOW SULFUR COKE FROM VIRGIN RESIDUA
3707462 - CONVERSION OF HEAVY PETROLEUM FEEDSTOCKS
3726784 - INTEGRATED COAL LIQUEFACTION AND HYDROTREATING PROCESS
3726785 - COAL LIQUEFACTION USING HIGH AND LOW BOILING SOLVENTS
3733186 - TWO STEP CONTROLLED FLOW GASIFICATION PROCESS
3743593 - CATALYTIC CRACKING PROCESS WITH MAXIMUM FEED VAPORIZATION
3754876 - UPGRADING LOW RANK COALS AS FUEL
3779900 - PROCESS FOR FLUID COKING GASIFICATION IN AN INTEGRATED SYSTEM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

EXXON RESEARCH + ENGINEERING CO. (CONTINUED)

3790467 - COAL LIQUEFACTION SOLIDS REMOVAL
3810972 - REDUCTION OF SULPHUR OXIDES
3816084 - COKELESS COKER WITH RECYCLE OF COKE FROM GASIFIER TO HEATER
3835033 - SULFUR REMOVAL FROM MOLTEN MEDIA
3840476 - PROCESS FOR ACTIVATING CARBONACEOUS MATERIALS
3841991 - COAL CONVERSION PROCESS
3870621 - RESIDUUM PROCESSING
3890111 - TRANSFER LINE BURNER SYSTEM USING LOW OXYGEN CONTENT GAS
3891402 - TRANSFER LINE BURNER SYSTEM
3893907 - METHOD AND APPARATUS FOR THE TREATMENT OF TAR SAND FROTH
3933445 - PROCESS AND APPARATUS FOR PREVENTING DEPOSITS ON A GAS INLET NOZZLE
3957459 - COAL GASIFICATION ASH REMOVAL SYSTEM
3996063 - METHOD FOR REMOVING COKE FROM FLUID COKER OUTLETS
4003823 - COMBINED DESULFURIZATION AND HYDROCONVERSION WITH ALKALI METAL HYDROXIDES
4007092 - PROCESS FOR PRODUCING LOW SULFUR COKE
4007093 - FURNACE FOR THERMAL PROCESSING OF LUMP SOLID FUEL
4022680 - HYDROGEN DONOR SOLVENT COAL LIQUEFACTION PROCESS
4036732 - TAR SANDS EXTRACTION PROCESS
4039425 - METHOD FOR PREPARING A COAL SLURRY SUBSTANTIALLY DEPLETED IN MINERAL-RICH PARTICLES
4045328 - PRODUCTION OF HYDROGENATED COAL LIQUIDS
4048054 - LIQUEFACTION OF COAL
4049536 - COAL LIQUEFACTION PROCESS
4049537 - COAL LIQUEFACTION PROCESS
4051012 - COAL LIQUEFACTION PROCESS
4051016 - FLUID COKING WITH H/2\ S ADDITION
4057512 - ALKALI METAL CATALYST RECOVERY SYSTEM
4060478 - COAL LIQUEFACTION BOTTOMS CONVERSION BY COKING AND GASIFICATION
4062656 - FLUIDIZED BED APPARATUS
4075079 - PROCESS FOR THE PRODUCTION OF HYDROCARBONS FROM COAL
4077867 - HYDROCONVERSION OF COAL IN A HYDROGEN DONOR SOLVENT WITH AN OIL-SOLUBLE CATALYST
4077869 - INTEGRATED COKING AND GASIFICATION PROCESS
4085031 - COAL LIQUEFACTION WITH SUBSEQUENT BOTTOMS PYROLYSIS
4085032 - HYDROGEN DONOR SOLVENT COAL LIQUEFACTION PROCESS
4085033 - HYDROGEN DONOR SOLVENT COAL LIQUEFACTION PROCESS
4085707 - COMBUSTION OR PART-COMBUSTION IN FLUIDIZED BEDS
4089772 - ALKYLATION OR ACYLATION OF LIQUEFACTION PRODUCT BOTTOMS
4092235 - TREATMENT OF COAL BY ALKYLATION OR ACYLATION TO INCREASE LIQUID PRODUCTS FROM COAL LIQUEFACTION
4094765 - COAL LIQUEFACTION PROCESS
4094768 - SEPARATION OF BITUMEN FROM TAR SANDS USING SULFUR AND WATER
4111787 - STAGED HYDROCONVERSION OF AN OIL-COAL MIXTURE
4113602 - INTEGRATED PROCESS FOR THE PRODUCTION OF HYDROCARBONS FROM COAL OR THE LIKE IN WHICH FINES FROM GASIFIER ARE COKED WITH HEAVY HYDROCARBON OIL
4123347 - COAL LIQUEFACTION PROCESS
4125452 - INTEGRATED COAL LIQUEFACTION PROCESS

FIRESTONE TIRE AND RUBBER COMPANY

3582279 - OXIDATIVE DISTILLATION OF RUBBER VULCONIZATE
3772242 - REINFORCED BY SCRAP RUBBER CHAR
3823221 - PRODUCTION OF A CHAR REINFORCING AGENT FROM PYROLYZED SCRAP-RUBBER
3823223 - RUBBER REINFORCING AGENT
3823224 - PRODUCTION OF A CHAR REINFORCING AGENT FROM PYROLYZED SCRAP-RUBBER

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

FIRMA CARL STILL RECKLINGHAUSEN
4123331 - METHOO OF KEEPING THE CIRCULATING SPRINKLING WATER FOR THE UPTAKES OF COKE OVENS CLEAN

FIRMA CARL STILL
3623959 - METHOD ANO APPARATUS COKING FURNACE UNIT
3652403 - METHOD ANO APPARATUS FOR THE EVACUATION OF COKE FROM A FURNACE CHAMBER
3753866 - PROCESS AND APPARATUS FOR MAKING COKE OF EVEN SIZE
4050990 - METHOO ANO APPARATUS FOR PROOUCING FORM COKE
4105504 - APPARATUS FOR PROOUCING FORM COKE
4115202 - APPARATUS FOR PROOUCING NON-ABRASIVE COKE FORMS FROM BROWN-COAL BRIQUETS

FISCHER HOLOINGS LTD.
3758385 - PROCESS FOR COKING LIGNITIC COAL

FMC CORPORATION
3453202 - HYOROGENATION OF COAL TAR
3574065 - FRACTIONAL CARBONIZATION OF COAL
3721608 - FLUIOIZING OEVICES FOR FLUIO BEOS, WITH IN-PROCESS CLEANING
3801514 - PROCESS FOR REGENERATING SPENT ACTIVE CARBON IN A SUSPENSION OISPERSION TRANSPORT SYSTEM
3996108 - BRIQUETTING OF REACTIVE COAL CALCINATE WITH HIGH-TEMPERATURE COKE OVEN PITCH

FOREST FUELS, INC.
4095958 - APPARATUS ANO METHOO FOR PROOUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

FOSTER WHEELER CORPORATION
3467587 - WASTE INCINERATOR STEAM GENERATOR-FLASH EVAPORATOR OESALINATION UNIT

FOSTER WHEELER ENERGY CORPORATION
4095953 - MOOULAR SYSTEM FOR REOUCING SULFUR OIOXIOE

FUJI KASUI ENGINEERING CO., LTO.
3997407 - APPARATUS FOR OISPOSAL OF RUBBER WASTE

GARBALIZER CORPORATION OF AMERICA
3725538 - PROOUCTION OF CARBON FROM WASTE MATERIALS

GENERAL ELECTRIC COMPANY
3811849 - REFRACTORY BODIES AS FIXED BEO COAL GASIFICATION OILUENTS

GILBERT ASSOCIATES, INC.
4067700 - METHOD FOR GASIFYING COAL

GOSUDARSTVENNY VSESOJUZNY INSTITUT PO -
3542650 - METHOO OF LOADING CHARGE MATERIALS INTO A HORIZONTAL COKE OVEN

GREAT CANADIAN OIL SANDS LIMITED
3466240 - COKING A MIXTURE OF TAR SANOS ANO FROTH PROOUCT
3487003 - REMOVAL OF CLAY FROM THE WATER STREAMS OF THE HOT WATER PROCESS BY FLOCCULATION
3496093 - UTILIZING ION EXCHANGE TO REOUCE FRESH WATER REQUIREMENT OF HOT WATER PROCESS
3502565 - EFFLUENT OISCHARGE BITUMEN RECOVERY BY SETTLING
3502566 - BACTERIAL TREATMENT OF HOT WATER PROCESS EFFLUENT OISCHARGE
3509641 - TAR SANDS CONOITIONING VESSEL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

GREAT CANADIAN OIL SANDS LIMITED (CONTINUED)

3526585 - REMOVING SUSPENDED SOLIDS FROM A LIQUID
3530041 - CONTINUOUS SETTLED DENSITY ANALYSES
3530042 - APPARATUS AND CONTROL FOR -HOT WATER PROCESS
3594306 - SEPARATION CELL AND SCAVENGER CELL FROTHS TREATMENT
3607720 - HOT WATER PROCESS IMPROVEMENT
3751358 - FREEZE-THAW SEPARATION OF SOLIDS FROM TAR SANDS EXTRACTION EFFLUENTS
3884829 - METHODS AND COMPOSITIONS FOR REFINING BITUMINOUS FROTH RECOVERED FROM TAR SANDS
3900389 - METHOD FOR UPGRADING BITUMINOUS FROTH
3901791 - METHOD FOR UPGRADING BITUMEN FROTH
3931006 - METHOD OF REDUCING SLUDGE ACCUMULATION FROM TAR SANDS HOT WATER PROCESS
3936358 - METHOD OF CONTROLLING THE FEED RATE OF QUENCH WATER TO A COKING DRUM IN RESPONSE TO THE INTERNAL PRESSURE THEREIN
3951779 - IMPROVED HYDROSEPARATION PROCESS FOR AQUEOUS EXTRACTION OF BITUMEN FROM TAR SANDS
3953318 - METHOD OF REDUCING SLUDGE ACCUMULATION FROM TAR SANDS HOT WATER PROCESS
3969220 - AERATING TAR SANDS-WATER MIXTURE PRIOR TO SETTLING IN A GRAVITY SETTLING ZONE
3986592 - HOT WATER EXTRACTION CELL CONTAINING TWO OR MORE DEFLECTION BAFFLES
3990885 - PROCESS FOR RECOVERING HYDROCARBONS AND HEAVY MINERALS FROM A TAR SAND HOT WATER PROCESS WASTE STREAM
3998702 - APPARATUS FOR PROCESSING BITUMINOUS FROTH
4008146 - METHOD OF SLUDGE DISPOSAL RELATED TO THE HOT WATER EXTRACTION OF TAR SANDS
4018664 - METHOD FOR REDUCING MINERAL CONTENT OF SLUDGE
4018665 - RECYCLING AERATED SCAVENGED MIDDLINGS TO CONDITIONING STEP OF HOT WATER EXTRACTION PROCESS
4033853 - PROCESS AND APPARATUS FOR HEATING AND DEAERATING RAW BITUMINOUS FROTH

GREAT LAKES CARBON CORPORATION

3506745 - METHOD OF ELIMINATING PUFFING IN THE MANUFACTURE OF ELECTRODES FROM PUFFING PETROLEUM COKE
3546076 - METHOD OF PRODUCING METALLURGICAL COKE
3619376 - METHOD OF MAKING METALLURGICAL COKE BRIQUETTES FROM COAL, RAW PETROLEUM COKE, INERT MATERIAL AND A BINDER
3822218 - PRODUCTION OF ACTIVATED CARBON FROM RUBBER AND A CARBONACEOUS BINDER
3836434 - PROCESS FOR DECOKING A DELAYED COKER
3880359 - APPARATUS FOR DECOKING A DELAYED COKER
3896556 - COOLING AND DE-DUSTING OF HOT PARTICULATE MATERIAL PARTICULARLY CALCINED PETROLEUM COKE
3953928 - COOLING OF HOT PARTICULATE MATERIAL PARTICULARLY CALCINED PETROLEUM COKE
4053365 - ROTARY CALCINER

GRIFFITH LABORATORIES, INCORPORATED

3873741 - AIR REGULATION IN THE PYROLYSIS OF WOOD TO PRODUCE LIQUID SMOKE FOR THE TREATMENT OF FOOD PRODUCTS

GUARDIAN CHEMICAL CORPORATION

4120777 - PROCESS FOR RECOVERY OF BITUMINOUS MATERIAL FROM TAR SANDS

GULF OIL CANADA LIMITED

3816305 - CLARIFICATION OF TAR SANDS MIDDLINGS WATER

GULF OIL CORPORATION

3997422 - COMBINATION COAL DEASHING AND COKING PROCESS

GULF RESEARCH + DEVELOPMENT COMPANY

3640816 - MULTIPLE STAGE PROCESS FOR PRODUCING LIGHT LIQUIDS FROM COAL
3957619 - PROCESS FOR THE CONVERSION OF CARBONACEOUS MATERIALS
3997426 - PROCESS FOR THE CONVERSION OF CARBONACEOUS MATERIALS
4032429 - COAL LIQUEFACTION PROCESS USING AN ALUMINUM PHOSPHATE SUPPORTED CATALYST
4080282 - CATALYTIC REACTOR AND PROCESS FOR HYDROGENATING SOLID-CONTAINING CARBONACEOUS MATERIALS IN SAID REACTOR
4080285 - THERMAL CRACKING OF SHALE OIL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

GULF RESEARCH + OEVELOPMENT COMPANY (CONTINUED)

4081361 - PROCESS FOR THE CONVERSION OF CARBONACEOUS MATERIALS
4083769 - CATALYTIC PROCESS FOR LIQUEFYING COAL
4090942 - PROCESS FOR PRODUCING BENZENE
4102774 - SEPARATION OF SOLIOS FROM COAL LIQUIOS USING AN AOOITIVE
4104200 - HYOROGENATING CATALYST
4110192 - PROCESS FOR LIQUEFYING COAL EMPLOYING A VENTED OISSOLVER
4116808 - PROCESS FOR HYDROGENATING A SOLID CARBONACEOUS MATERIAL WITH NI/TI/MO ON A MANGESIUM-OEFICIENT MAGNESIUM ALUMINATE SPINE L-AS CATALYST
4124485 - SEPARATION OF SOLIDS FROM COAL LIQUIOS WITH AN AOOITIVE BLENO
4128471 - COAL LIQUEFACTION PROCESS EMPLOYING CARBON MONOXIOE

HANOVER RESEARCH CORPORATION
4013516 - APPARATUS AND PROCESS FOR THE PYROLYSIS OF WASTE SOLIOS CONCENTRATES

HARTUNG, KUHN + CO. MASCHINENFABRIK GMBH
3964977 - METHOD ANO APPARATUS FOR OPERATING A LEVELING DEVICE FOR A COKING OVEN

HAZEN RESEARCH, INC.
4098584 - REMOVAL OF IMPURITIES FROM COAL
4119410 - PROCESS FOR IMPROVING COAL
4120665 - PROCESS FOR IMPROVING COAL

HEINRICH KOOPERS GMBH
3607660 - PROCESS FOR REGULATING THE TEMPERATURE OF A COKE OVEN CHAMBER
3619375 - PROCESS FOR MAINTAINING TEMPERATURE DIFFERENTIAL IN COKING CHAMBER OF HORIZONTAL COKING OVEN
3753867 - APPARATUS FOR CHARGING COKE OVENS
3839156 - PROCESS AND APPARATUS FOR CONTROLLING THE HEATING OF A HORIZONTAL BY-PROOUCT COKE OVEN
3841977 - APPARATUS FOR CLEANING THE ASCENSION PIPES OF COKE OVENS
3988211 - APPARATUS FOR QUENCHING COKE PUSHED FROM COKE OVENS

HERCULES INCORPORATED
3736111 - PROCESS AND APPARATUS FOR THE COMPLETE RECLAMATION OF VALUABLE PRODUCTS FROM SOLIO WASTE
3998756 - PREPARATION OF ACTIVATEO CARBONACEOUS MATERIAL FROM SEWAGE SLUDGE ANO SULFURIC ACIO

HOOGOVENS IJMUIOEN B.V.
3959082 - METHOO OF OPERATING A BATTERY OF COKE OVENS
4021309 - AUTOMATIC COKE OVEN PLANT WITH MEANS TO INSURE SUFFICIENT COKING

HOUILLERES DU BASSIN OE LORRAINE
4038153 - COKE MANUFACTURING PROCESS
4110168 - PROCESS FOR THE SEPARATION OF TARRY OUSTS FROM COKE OVEN GAS

HUSKY INDUSTRIES INC.
4100032 - PROCESS FOR CARBONIZING LIGNITE COAL

HUTTENWERK OBERHAUSEN AG., FIRMA
3506590 - MANUFACTURE OF SYNTHESIS-, HYDROGENATING-, OR REDUCTION-GAS

HYOROCARBON RESEARCH INC.
3483116 - PROOUCTION OF HYDROCARBONS FROM SHALE
3519552 - SOLIDS ORYING PROCESS
3519553 - COAL CONVERSION PROCESS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

HYDROCARBON RESEARCH INC. (CONTINUED)

3519554 - RESIDUUM RECOVERY FROM COAL CONVERSION PROCESS
3519555 - EBULLATED BED COAL HYDROGENATION
3607719 - LOW PRESSURE HYDROGENATION OF COAL
3617465 - COAL HYDROGENATION
3617474 - LOW SULFUR FUEL OIL FROM COAL
3679573 - TWO STAGE COUNTER-CURRENT HYDROGENATION OF COAL
3700584 - HYDROGENATION OF LOW RANK COAL
3704108 - HYDROCONVERSION OF WASTE NATURAL AND SYNTHETIC RUBBERS
3725241 - SOLIDS REMOVAL FROM HYDROGENATED COAL LIQUIDS
3755137 - MULTI-STAGE EBULLATED BED COAL-OIL HYDROGENATION AND HYDROCRACKING PROCESS
3769198 - HYDROGENATION OF COAL USING UNREDUCED CATALYST
3775071 - METHOD FOR FEEDING DRY COAL TO SUPERATOMOSPHERIC PRESSURE
3791957 - COAL HYDROGENATION USING PRETREATMENT REACTOR
3856658 - SLURRIED SOLIDS HANDLING FOR COAL HYDROGENATION
3862108 - HYDROGENATION OF RESIDUUM
3962070 - H-COAL PROCESS" SLURRY OIL RECYCLE SYSTEM
3976557 - PRETREATMENT OF COAL-DERIVED LIQUID TO IMPROVE MAGNETIC SEPARATION OF SOLIDS
4045329 - COAL HYDROGENATION WITH SELECTIVE RECYCLE OF LIQUID TO REACTOR
4054504 - CATALYTIC HYDROGENATION OF BLENDED COAL AND RESIDUAL OIL FEEDS
4099933 - PROCESS FOR THE MULTIPLE ZONE GASIFICATION OF COAL
4111788 - STAGED HYDROGENATION OF LOW RANK COAL

INDUSTRIAL HIGH PRESSURE SYSTEMS INC.

3892250 - HYDRAULIC CLEANER FOR DOORS AND THE LIKE

INGERSOLL-RAND RESEARCH INC.

3976548 - APPARATUS FOR PROCESSING COAL AND LIKE MATERIAL
4106997 - METHODS FOR CONVERTING COAL TO A PLASTIC-LIKE CONDITION AND FEEDING SAME TO A RECEIVER

INLAND STEEL COMPANY

3992266 - RECOVERY OF COAL FINES FROM PREHEATER
4097245 - METHOD FOR PRODUCING CARBONACEOUS MATERIAL

INSTITUTE OF GAS TECHNOLOGY

3421868 - FREE FALL SHALE HYDROGASIFICATION
3640016 - DESULFURIZATION OF COAL
3861885 - CARBON BLACK FUEL PRODUCTION
3867110 - METHOD OF COAL PRETREATMENT
3884649 - COAL PRETREATER AND ASH AGGLOMERATING COAL GASIFIER
3891403 - OIL SHALE HYDROGASIFICATION PROCESS
4003821 - PROCESS FOR PRODUCTION OF HYDROCARBON LIQUID FROM OIL SHALE
4057402 - COAL PRETREATMENT AND GASIFICATION PROCESS

INSTITUT NATIONAL DE L INDUSTRIE CHARBONNIERE

3476649 - CARBONISATION OF SOLID FUELS
3535209 - METHOD AND APPARATUS FOR THE HIGH-SPEED CARBONISATION OF SOLID FUELS OF SMALL PARTICLE SIZE SUCH AS COAL

INTERLAKE INC.

3966563 - COKE GUIDE SPRAY SYSTEM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

INTERMOUNTAIN OIL RESEARCH, INC.
4110194 - PROCESS AND APPARATUS FOR EXTRACTING BITUMINOUS OIL FROM TAR SANDS

INTERNATIONALE ERFINDER- UND PATENTANSTALT
3819724 - PROCESS FOR THE CONVERSION OF CARBON TO ALCOHOLS

INTERNATIONAL MINERALS + CHEMICAL CORPORATION
3723310 - PROCESS FOR FLOCCULATING OIL AND CLAY-CONTAINING SLIMES

INTERNATIONAL OILS EXPLORATION N.L.
3966561 - APPARATUS FOR THE CARBONIZATION OF COAL

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
4002457 - SOIL CONDITIONERS AND FERTILIZERS FROM SPENT SULFITE LIQUOR
4073660 - RECOVERY OF CHEMICAL COMPONENTS OF CELLULOSIC REGENERATING SOLUTION

IWATANI AND COMPANY LIMITED
3513044 - METHOD FOR THE PRODUCTION OF A HIGH ENERGY FUEL EMPLOYING ELECTRIC SPARK DISCHARGE

JAPAN ENG. CO., LTD.
3950267 - PROCESS FOR PRODUCING ACTIVATED CARBON

JGC CORPORATION
4120644 - APPARATUS FOR REGENERATION OF SPENT ACTIVE CARBON

J. M. HUBER CORPORATION
3533961 - METHOD OF PRODUCING SPHERICAL PELLETS OF ACTIVATED CARBON
3536589 - AMMONIUM NITRATE TREATMENT OF FINELY DIVIDED COAL TO REDUCE SWELLING AND COKING

KAISER STEEL CORPORATION
3888302 - METHOD FOR REMOVING DEPOSITS FROM INTERIOR SURFACES OF REGENERATIVE HEAT EXCHANGERS

KELLER CORPORATION
4030893 - METHOD OF PREPARING LOW-SULFUR, LOW-ASH FUEL

KENNECOTT COPPER CORPORATION
3812017 - DESULFURIZED CHAR WITH PHOSPHORIC ACID
3960513 - METHOD FOR REMOVAL OF SULFUR FROM COAL

KERR-MCGEE CORPORATION
3607716 - FRACTIONATION OF COAL LIQUEFACTION PRODUCTS IN A MIXTURE OF HEAVY AND LIGHT ORGANIC SOLVENTS
3607717 - FRACTIONATING COAL LIQUEFACTION PRODUCTS WITH LIGHT ORGANIC SOLVENTS
3607718 - SOLVATION AND HYDROGENATION OF COAL IN PARTIALLY HYDROGENATED HYDROCARBON SOLVENTS
3642608 - SOLVATION OF COAL IN BYPRODUCT STREAMS
4028219 - PROCESS FOR THE PRODUCTION OF DEASHED COAL LIQUIFACTION PRODUCTS
4070267 - COAL PROCESSING SYSTEM FOR REDUCING THE AMOUNT OF INSOLUBLE COAL PRODUCTS IN A LIGHT FRACTION STREAM
4070268 - SOLVENT RECOVERY IN A COAL DEASHING PROCESS
4090957 - SYSTEM FOR SEPARATING SOLUBLE AND INSOLUBLE COAL PRODUCTS FROM A FEED MIXTURE
4090958 - COAL PROCESSING SYSTEM FOR PRODUCING A STREAM OF FLOWABLE INSOLUBLE COAL PRODUCTS
4092237 - PROCESS FOR TREATING OIL SHALES
4119523 - PROCESSES FOR THE PRODUCTION OF DEASHED COAL
4119524 - COAL DEASHING PROCESS HAVING IMPROVED SOLVENT RECOVERY TECHNIQUES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

KINGSFORD COMPANY
3483134 - IMPACT PULVERIZATION PLUS ADDITIVES IN THE PRODUCTION OF ACTIVATED CARBON FROM COAL
3852048 - PROCESS FOR PRODUCING INDUSTRIAL FUEL FROM WASTE WOODY MATERIALS
3950143 - PROCESS FOR PRODUCING SOLID INDUSTRIAL FUEL
3977947 - FLUIDIZED BED CARBONIZATION

KOA OIL CO., LTD.
4100265 - PROCESS FOR PREPARATION OF HIGH QUALITY COKE

KOGYO KAIHATSU KENKYUSHO (INDUSTRIAL RESEARCH INSTITUT)
4097541 - PROCESS OF PRODUCING MAINLY MONOCYCLIC AROMATIC COMPOUNDS FROM UNUTILIZED CARBON RESOURCES MAINLY COMPOSED OF POLYCYCLIC AROMATIC COMPOUNDS

KONINKLIJKE NEDERLANDSCHE HOOGOVENS EN STAALFABRIEKEN N.V.
3862015 - QUENCHING TOWER FOR QUENCHING COKE AND SIMILAR MATERIALS, AND A QUENCHING DEVICE AS PART OF SUCH A TOWER

KOPPELMAN; EDWARD
4069107 - CONTINUOUS THERMAL REACTOR SYSTEM AND METHOD
4106999 - CONTINUOUS THERMAL REACTOR
4126519 - APPARATUS AND METHOD FOR THERMAL TREATMENT OF ORGANIC CARBONACEOUS MATERIAL

KOPPERS COMPANY INC.
3444046 - METHOD FOR PRODUCING COKE
3480514 - ASCENSION PIPE CLEANING APPARATUS IN COMBINATION WITH A HORIZONTAL COKE OVEN BATTERY
3491356 - METHOD FOR MONITORING THE HEATING OF COKE OVENS IN RELATION TO A PUSHING SEQUENCE
3501380 - METHOD AND APPARATUS FOR MEASURING THE TEMPERATURE OF COKE OVEN WALLS
3519539 - APPARATUS FOR RETORTING OIL SHALE HAVING A CENTRAL AXIAL HOLLOW COLUMN
3546092 - OIL SHALE RETORTING METHOD AND
3556947 - METHOD FOR REGULATING THE HEATING OF COKE OVENS
3577784 - METHOD AND APPARATUS FOR MEASURING COKE OVEN FLUE WALL TEMPERATURES
3580813 - CONDITION RESPONSIVE WATER QUENCH IN A CLOSED COKE COOLING SYSTEM
3591462 - METHOD AND APPARATUS FOR THE CONTINUOUS CARBONIZATION OF COAL
3616947 - LOAD SENSING DEVICE FOR A COKE OVEN LEVELING BAR
3843459 - SYSTEM AND METHOD FOR CONTROLLING EMISSIONS WHILE PUSHING COKE FROM A COKE OVEN
3897311 - PUSHER RAM AND QUENCH CAR TRAVEL SYNCHRONIZATION SYSTEM
3963582 - METHOD AND APPARATUS FOR SUPPRESSING THE DEPOSITION OF CARBONACEOUS MATERIAL IN A COKE OVEN BATTERY
3984289 - COKE QUENCHER CAR APPARATUS
4004985 - SYSTEM FOR QUENCHING HOT COKE
4024023 - APPARATUS AND METHOD FOR TRANSFERRING HOT COKE TO A DRY COKE COOLER
4048020 - METHOD AND APPARATUS FOR THE CONTROL OF PITCH OPERATION
4061544 - APPARATUS FOR PROVIDING WASTE GAS RECIRCULATION IN COKE OVEN BATTERIES
4107001 - HIGH PRESSURE WATER CLEANER FOR ASCENSION PIPES

KOPPERS, HEINRICH, GESELLSCHAFT MIT BESCHRANKTER HAFTUNG
3840653 - PROCESS FOR ELIMINATING THE FORMATION OF WASTE LIQUOR DURING THE DESULFURIZATION OF COKE OVEN GAS

KRUPP KOPPERS GMBH
4111756 - METHOD OF AND APPARATUS FOR HEATING UP A CHAMBER OF A COKING BATTERY

KURITA WATER INDUSTRIES LTD.
4022639 - METHOD FOR REMOVING CARBON SCALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

KVB ENGINEERING, INC.
3909211 - COAL DESULFURIZATION PROCESS

LAMPL; HELMA
4084521 - METHOD AND APPARATUS FOR THE PYROLYSIS OF WASTE PRODUCTS

LEAS BROTHERS DEVELOPMENT CORPORATION
3769197 - POLLUTION-FREE FUELS
3779893 - PRODUCTION OF DESULFURIZED LIQUIDS AND GASES FROM COAL
3985548 - DIRECT METAL REDUCTION FROM COAL
4078989 - COAL CONVERSION PROCESS

LUMMUS COMPANY
3617515 - PRODUCTION OF NEEDLE COKE FROM COAL FOR PITCH
3852182 - COAL LIQUEFACTION
3852183 - COAL LIQUEFACTION
3856675 - COAL LIQUEFACTION
3873427 - DESULFURIZING COKE USING A FERRUGINOUS MATERIAL AND A METAL CHLORIDE
3932266 - SYNTHETIC CRUDE FROM COAL
3933596 - DESULFURIZATION OF COKE
3947346 - COAL LIQUEFACTION
3954595 - COAL LIQUEFACTION
3974073 - COAL LIQUEFACTION
4028221 - LIQUEFACTION OF SUB-BITUMINOUS AND LIGNITIC COAL
4040957 - SEPARATION OF INSOLUBLE MATERIAL FROM COAL LIQUEFACTION PRODUCT BY USE OF A DILUENT
4077881 - SEPARATION OF INSOLUBLE MATERIAL FROM COAL LIQUEFACTION PRODUCT BY GRAVITY SETTLING
4094781 - SEPARATION OF SOLIDS FROM TAR SANDS EXTRACT

MAGNA INTERNATIONAL INC.
4110195 - APPARATUS AND PROCESS FOR EXTRACTING OIL OR BITUMEN FROM TAR SANDS

MANNESMANN AKTIENGESELLSCHAFT
3890908 - METHOD AND APPARATUS FOR PYROLYTICALLY REDUCING WASTE
3971704 - METHOD AND APPARATUS FOR POLLUTION FREE, DESTRUCTIVELY PROCESSING WASTE

MARATHON OIL COMPANY
3448012 - ROTARY CONCENTRIC PARTITION IN A COKE OVEN HEARTH
3607062 - PROCESS AND APPARATUS FOR THE FLUIDIZED CALCINING OF COKE
3612497 - CENTER FEED ROTARY HEARTH CALCINER
3644194 - RECOVERY OF OIL FROM TAR SANDS USING WATER-EXTERNAL MICELLAR DISPERSIONS
3652404 - DEVOLATILIZING PROCESS USING RABBLES AND FORMING DEVICES FOR CONVEYING MATERIALS
3652426 - PROCESS AND APPARATUS FOR REMOVAL OF VOLATILE MATTER BY ELECTRICAL RESISTANCE HEATING
3660268 - RECOVERY OF OIL FROM TAR SANDS USING HIGH WATER CONTENT OIL-EXTERNAL MICELLAR DISPERSIONS
3712855 - CONTROL OF CALCINED PETROLEUM COKE PARTICLE SIZE
3745110 - THERMAL DECOKING OF DELAYED COKING DRUMS
3763011 - ROTARY HEARTH CALCINER HAVING STATIONARY SOAKING PIT
3892633 - COKE CUTTING WITH AID OF VIBRATION DETECTORS
3929193 - RECOVERY OF ORGANIC MATTER FROM ORGANIC MINERAL-CONTAINING DEPOSITS
3960702 - VAPOR PHASE WATER PROCESS FOR RETORTING OIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

MCCLEARY, JR. CLIFTON
3976438 - GASOLINE ADDITIVE AND METHOD FOR MAKING SAME

MCDOWELL-WELLMAN ENGINEERING COMPANY
3441480 - METHOD FOR PROGRESSIVE HEATING OF SOLID PARTICULATE MATERIALS
3454382 - TWO-STAGE TYPE GAS PRODUCER
3470275 - PROCESS FOR MAKING CARBON AGGLOMERATES
3668077 - PROCESS FOR CONVERSION OF MUNICIPAL WASTE
4039427 - PROCESS FOR RETORTING OIL SHALE
4111755 - METHOD OF PRODUCING PELLETIZED FIXED SULFUR FUEL

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3560346 - PROCESS FOR PRODUCING SHAPED COKE
3655518 - RETORT SYSTEM FOR OIL SHALES AND THE LIKE
3700564 - CONTINUOUS PROCESS OF PRODUCING SHAPED METALLURGICAL COKE
3703442 - METHOD FOR THE LOW-TEMPERATURE DISTILLATION OF FINELY GRANULAR BITUMINOUS MATERIALS WHICH FORM A PULVERULENT RESIDUE IN THE PROCESS
3705086 - COAL CARBONIZING IN TRICKLING STREAMS
3756922 - MIXING NOZZLES FOR CARBONIZING FINE GRAIN FUELS IN A FLUIDIZED BED
3774315 - PROCESS AND APPARATUS FOR COOLING HOT BRIQUETTES
3884620 - PROCESS AND APPARATUS FOR CONTINUOUSLY HEATING FINE-GRAINED COAL
3962043 - PROCESS FOR PRODUCING FINE-GRAINED COKE BY DEGASIFICATION OF COAL
4002534 - CONTINUOUS COKING PROCESS
4038045 - PROCESS FOR DEGASIFYING FINE-GRAINED FUELS
4054492 - PROCESS FOR TREATING BITUMINOUS OR OIL-CONTAINING MATERIAL USING DRY DISTILLATION
4098674 - RECOVERY OF HYDROCARBONACEOUS MATERIAL FROM TAR SANDS

MIFUJI IRON WORKS CO., LTD.
3942956 - PROCESS FOR ELIMINATING NITROGENOUS INGREDIENTS FROM SOLID FUEL
4049395 - METHOD FOR TREATING RAW MATERIAL WITH A TREATING GAS
4060393 - APPARATUS FOR TREATING RAW MATERIAL WITH A TREATING GAS

MINERAL CONCENTRATES + CHEMICAL COMPANY, INC.
4094769 - METHOD AND APPARATUS FOR RETORTING OIL SHALE

MINERALS RESEARCH CORPORATION
4029568 - METHOD OF RECOVERY OF OIL AND BITUMEN FROM OIL-SANDS AND OIL SHALE

MITSUBISHI CHEMICAL INDUSTRIES LTD.
3764482 - METHOD FOR RECOVERING GAS GENERATED IN A COKE OVEN WHEN CHARGING COAL

MITSUBISHI HEAVY INDUSTRIES, LTD.
4052172 - PROCESS FOR GASIFYING COAL OR OTHER CARBON CONTAINING MATERIAL

MITSUBISHI JUKOGYO KABUSHIKI KAISHA
4074979 - THERMAL DECOMPOSITION APPARATUS

MITSUI COKE CO. LTD.
4029749 - PROCESS FOR MANUFACTURING NEEDLE COKE
4111786 - PROCESS FOR LIQUEFYING COAL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

MITSUI MINING + SMELTING CO., LTD.
4117098 - PROCESS FOR MANUFACTURING A CARBONACEOUS MATERIAL

MOBIL OIL CORPORATION
3483115 - TRAVELLING GRATE SHALE RETORTING
3501394 - GAS LIFT RETORTING PROCESS FOR OBTAINING OIL FROM FINE PARTICLES CONTAINING HYOROCARBONACEOUS MATERIAL
3503869 - PROCESS FOR IMPROVING THERMAL EFFICIENCY OF GAS COMBUSTION SHALE RETORTING
3562143 - LIQUIO DISENGAGING SYSTEM
3574087 - METHOO AND APPARATUS FOR RETORTING OIL SHALES
3923634 - LIQUEFACTION OF COAL
4022588 - OXIDATIVE CHEMICAL REMOVAL OF PYRITIC SULFUR FROM COAL BY MANGANESE, VANAOIUM, ANO CERIUM OXIOANTS
4032428 - LIQUEFACTION OF COAL
4035281 - PRODUCTION OF FUEL OIL
4046668 - OOUBLE SOLVENT EXTRACTION OF ORGANIC CONSTITUENTS FROM TAR SANOS
4049734 - CONVERSION OF COAL TO HIGH OCTANE GASOLINE
4052170 - MAGNETIC DESULFURIZATION OF AIRBORNE PULVERIZEO COAL
4052291 - PRODUCTION OF ASPHALT CEMENT
4052292 - LIQUEFACTION OF SOLID CARBONACEOUS MATERIALS
4076505 - COAL OESULFURIZATION PROCESS
4077866 - PROCESS FOR PROOUCING LOW-SULFUR LIQUID ANO SOLIO FUELS FROM COAL
4078991 - TREATMENT OF CLAY MATERIALS TO FORM SUPER-ACTIVE CATALYST
4081351 - CONVERSION OF COAL INTO MOTOR FUEL
4089773 - LIQUEFACTION OF SOLID CARBONACEOUS MATERIALS
4105535 - CONVERSION OF COAL-OERIVEO LIQUIOS WITH A CRYSTALLINE ALUMINOSILICATE ZEOLITE CATALYST
4108730 - METHOD FOR TREATMENT OF RUBBER ANO PLASTIC WASTES
4108758 - CONVERSION OF COAL INTO LIQUID FUELS
4118201 - PROOUCTION OF LOW SULFUR FUELS FROM COAL
4118281 - CONVERSION OF SOLIO WASTES TO FUEL COKE AND GASOLINE/LIGHT OIL

MONSANTO COMPANY
4092098 - METHOD AND APPARATUS FOR IMPROVED IN SITU COMBUSTION OF PYROLYSIS GASES IN A KILN

MONSANTO ENVIRO-CHEM SYSTEMS, INC.
3862887 - METHOO FOR PROCESSING HEAT-DECOMPOSABLE NON-GASEOUS MATERIALS

NALCO CHEMICAL COMPANY
3700587 - SILICONE OIL ANTIFOAM

NATIONAL RESEARCH OEVELOPMENT CORPORATION
3962045 - APPARATUS FOR PYROLYSIS OF DOMESTIC ANO OTHER WASTE MATERIALS

NATIONAL STEEL CORPORATION
4113572 - POLLUTION CONTROL SYSTEM INCLUOING A ONE-SPOT QUENCH-CAR FOR COKE PROOUCING INSTALLATIONS

NATOMAS COMPANY
4120775 - PROCESS AND APPARATUS FOR SEPARATING COARSE SANO PARTICLES ANO RECOVERING BITUMEN FROM TAR SANDS

NEW ENERGY SOURCES COMPANY
4096057 - APPARATUS ANO METHOD FOR RECOVERY OF BITUMINOUS PROOUCTS FROM TAR SANOS

NICHOLS ENGINEERING + RESEARCH CORPORATION
3650830 - RECOVERY SYSTEM
4115317 - METHOD AND APPARATUS FOR REGENERATING AND MANUFACTURING ACTIVATEO CARBON

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

NIPPON CARBON COMPANY LIMITEO
3927986 - APPARATUS FOR INCINERATING A PLASTIC WASTE

NIPPON KOKAN KABUSHIKI KAISHA
3878052 - METHOO OF PRODUCING METALLURGICAL COKE
4045292 - METHOD FOR CONTROLLING COMBUSTION IN COKE OVEN BATTERY
4076593 - METHOO ANO APPARATUS FOR CONTROLLING HEAT INPUT TO A WASTE HEAT BOILER BY USE OF BLEEDER GAS FROM A COKE DRY QUENCHING S TATION
4105501 - METHOO FOR PROOUCING METALLURGICAL COKE
4106998 - METHOD OF RESTRAINING EMISSION FROM COKE QUENCHING EQUIPMENT
4110169 - METHOO FOR MANUFACTURING HIGH-STRENGTH FORMEO COKE IN SLIGHT MUTUAL AGGLOMERATION USING HORIZONTAL TYPE COKE OVEN BATTER Y

NIPPON OIL COMPANY LTD.
4108682 - PROCESS FOR FLUIOIZEO CONTACT

NIPPON STEEL CORPORATION
3536590 - ANNULAR COKE OVEN CHAMBER WITH ROTATABLE TOP CHARGING HOOO ANO ROTATABLE ANO MOVABLE COKE OISCHARGE CONVEYOR MEANS
3541603 - APPARATUS FOR CONTINUOUS BAKING OF POWOEREO OR GRANULAR RAW MATERIALS FOR PRODUCING IRON AND FOR PRODUCING COKE
3775289 - METHOO FOR PROOUCING BITUMINOUS SUBSTANCE SUCH AS A COAL TAR
4102750 - PROCESS FOR PROOUCING FORMED COKE FOR METALLURGICAL USE

NISSHO-IWAI CO., LTO.
4033728 - SYNTHETIC CAKING COAL ANO METHOD FOR PROOUCTION THEREOF

OCCIOENTAL OIL SHALE, INC.
4093026 - REMOVAL OF SULFUR OIOXIOE FROM PROCESS GAS USING TREATED OIL SHALE ANO WATER
4125157 - REMOVING SULFUR OIOXIDE FROM GAS STREAMS WITH RETORTEO OIL SHALE
4126180 - METHOO OF ENHANCING YIELO FROM AN IN SITU OIL SHALE RETORT

OCCIOENTAL PETROLEUM CORPORATION
3698882 - CONTINUOUS PROCESS FOR THE CONVERSION OF CARBONACEOUS SOLIOS INTO PIPELINE GAS
3736233 - PROCESS OF PYROLYZING ANO DESULFURIZING SULFUR BEARING AGGLOMERATIVE BITUMINOUS COAL
3843457 - MICROWAVE PYROLYSIS OF WASTES
3919118 - PROCESS FOR DESULFURIZING CHAR
3941421 - APPARATUS FOR OBTAINING UNIFORM GAS FLOW THROUGH AN IN SITU OIL SHALE RETORT
3951456 - PROCESS FOR EFFECTING EVEN RETORT WORKING FLUIO FLOW THROUGHOUT AN IN SITU RETORT CONTAINING CARBONACEOUS OEPOSITS
3994343 - PROCESS FOR IN SITU OIL SHALE RETORTING WITH OFF GAS RECYCLING
4007963 - OIL COLLECTION AND RECOVERY SYSTEM FOR IN SITU OIL SHALE RETORT
4039390 - FEEO SYSTEM FOR PYROLYSIS REACTORS
4054420 - PROCESS FOR THE DESULFURIZATION OF CARBONACEOUS FUELS WITH AQUEOUS CAUSTIC ANO OXYGEN
4064018 - INTERNALLY CIRCULATING FAST FLUIOIZED BED FLASH PYROLYSIS REACTOR
4070250 - PYROLYSIS OF CARBONACEOUS MATERIALS IN A OOUBLE HELIX CYCLONE
4071432 - STAGEO HEATING BY OXIOATION OF CARBONACEOUS MATERIAL
4077847 - SOLID WASTE OISPOSAL SYSTEM
4078973 - LOOP PYROLYSIS PROCESS FOR ORGANIC SOLIO WASTES
4083751 - CONTINUOUS FEEO PYROLYSIS CHAMBER FOR DECOMPOSING SOLIO WASTE
4085030 - PYROLYSIS OF CARBONACEOUS MATERIALS WITH SOLVENT QUENCH RECOVERY
4087514 - PROCESS FOR OESULFURIZING CHAR
4097360 - QUENCHING PYROLYSIS REACTOR EFFLUENT STREAMS
4101263 - METHOO FOR HEATING NONGASEOUS CARBONACEOUS MATERIAL
4101412 - PROCESS ANO APPARATUS FOR RAPID PYROLYSIS OF CARBONACEOUS MATERIALS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

OCCIDENTAL PETROLEUM CORPORATION (CONTINUED)
4101416 - PROCESS FOR HYDROGENATION OF HYDROCARBON TARS
4102773 - PYROLYSIS WITH CYCLONE BURNER
4105502 - SIMPLIFIED LIQUEFACTION PYROLYSIS PROCESS AND APPARATUS THEREFOR
4108732 - HEATING CARBONACEOUS PARTICULATE MATERIAL
4116823 - VESSEL FOR STRIPPING OIL FROM FLUIDIZED ASH AND CHAR PARTICLES
4129440 - PROCESS FOR DISPOSAL OF SOLID WASTES

OCCIDENTAL RESEARCH CORPORATION
4053285 - PROCESS FOR REDUCING THE SULFIDE SULFUR CONTENT OF CHAR WITH CARBON DIOXIDE AND H/2\ O
4054421 - METHOD FOR DESULFURIZING CHAR BY ACID WASHING AND TREATMENT WITH HYDROGEN GAS

OIL SHALE CORPORATION
3496094 - APPARATUS AND METHOD FOR RETORTING SOLIDS
3510255 - RECOVERY OF SODIUM ALUMINATE FROM DAWSONITE
3573197 - PROCESS FOR RETORTING OIL SHALE
3597347 - PROCESS
3616266 - HORIZONTAL RETORT WITH SOLID HEAT TRANSFER MEDIUM
3691056 - PROCESS FOR RETORTING OIL SHALE IN THE ABSENCE OF SHALE ASH
3721730 - ALUMINA RECOVERY FROM RETORTED OIL SHALE RESIDUE
3859413 - ALUMINA RECOVERY FROM OIL SHALE RESIDUE
3925190 - PREHEATING OIL SHALE PRIOR TO PYROLYSIS THEREOF

OIL SHALE CORPORATION (TOSCO)
4038100 - CHAR COMPOSITION AND A METHOD FOR MAKING A CHAR COMPOSITION

OKLAHOMA PUBLISHING COMPANY
3841974 - PROCESS FOR THE MANUFACTURE OF CHARCOAL

ONO PHARMACEUTICAL COMPANY
4071414 - METHOD OF SMOKELESS CHARGING OF COKE OVENS WITH COAL CHARGE AND COAL-CHARGING MACHINE FOR EFFECTING SAME

OSAKA GAS COMPANY, LTD.
4009080 - METHOD OF TREATING WASTE COMBUSTION GAS FROM COKE OVEN
4014781 - METHOD FOR PRODUCING PITCH AND COKE

OTISCA INDUSTRIES LTD.
3941679 - SEPARATION OF HYDROCARBONACEOUS SUBSTANCES FROM MINERAL SOLIDS

OTTO CONSTRUCTION CORPORATION
3451896 - METHOD OF CLEANING A STREAM OF COKE OVEN GAS AND APPARATUS THEREFOR

PAN AMERICAN PETROLEUM CORPORATION
3464913 - OIL SHALE RETORTING METHOD
3487004 - CATALYTIC OXIDATION IN OIL SHALE RETORTING

PARAHO CORPORATION
3736247 - RETORTING OF SOLID CARBONACEOUS MATERIAL
3841992 - METHOD FOR RETORTING HYDROCARBONACEOUS SOLIDS
4066529 - METHOD OF DESIGN FOR VERTICAL OIL SHALE RETORTING VESSELS AND RETORTING THEREWITH
4090945 - METHOD OF OPERATING AN OIL SHALE KILN
4092128 - DESULFURIZED GAS PRODUCTION FROM VERTICAL KILN PYROLYSIS
4116779 - STARTING PROCEDURE FOR INTERNAL COMBUSTION VESSELS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PARAHO CORPORATION (CONTINUEO)
4116810 - INOIRECT HEATING PYROLYSIS OF OIL SHALE

PEABODY COAL COMPANY
3434931 - COKE, TAR, AND CLEAN COAL GAS PRODUCING METHOO ANO APPARATUS
3434932 - COKE AND HEAT PRODUCING METHOD
3434933 - METHOD FOR PROOUCING HIGH YIELO COKE BY DOWNORAFTING OF HOT GASES
3759673 - COAL DESULFURIZATION PROCESS
3839157 - WATER SPRAY OVER TRANSFER MECHANISM FOR COOLING CHARS
3969088 - FORMCOKE PROCESS
4100034 - QUENCHING METHOO

PENNSYLVANIA COKE TECHNOLOGY, INC.
4045299 - SMOKELESS NON-RECOVERY TYPE COKE OVEN
4124450 - METHOO FOR PRODUCING COKE

PETRO-CANAOA EXPLORATION INC.
4082646 - COKING OF BITUMINOUS SOLIDS WITH HOT SOLIOS RECYCLE

PETROLEO BRASILEIRO S.A. PETROBRAS
3887453 - PROCESS FOR OBTAINING OIL, GAS ANO BYPRODUCTS FROM PYROBITUMINOUS SHALE OR OTHER SOLIO MATERIALS IMPREGNATEO WITH HYOROC
ARBONS

PETROLITE CORPORATION
3929625 - SHALE OIL PURIFICATION

PHILLIPS PETROLEUM COMPANY
3454365 - ANALYSIS ANO CONTROL OF IN SITU COMBUSTION OF UNOERGROUNO CARBONACEOUS OEPOSIT
3457093 - PROOUCTION OF HIGH SOFTENING POINT ASPHALT
3459844 - WET PELLETING OF CARBON BLACK
3476650 - OIL SHALE PROCESS
3480512 - APPARATUS FOR EDUCING AND RECOVERING OIL FROM OIL-BEARING SOLIOS
3487001 - METHOO ANO APPARATUS FOR REMOVING OIL FROM OIL-YIELOING SOLIOS
3491016 - PROCESS FOR TREATING CRUSHEO OIL SHALE
3499834 - RETORTING OF HYOROCARBONACEOUS SOLIOS
3539466 - CATALYST PREPARATION
3551322 - CONVERSION OF OIL SHALE RETORTING GASES
3556979 - PROCESS FOR RETORTING OIL SHALE
3560367 - RECOVERY ANO CONVERSION OF SHALE OIL
3586621 - HYOROCARBON STEAM REFORMING, CONVERSION ANO REFINING
3619408 - HYDROISOMERIZATION OF MOTOR FUEL STOCKS
3728252 - DESULFURIZATION OF HEAVY LIQUID HYOROCARBON WITH CARBON MONOXIDE AT HIGH PRESSURE
3847549 - METHOO OF GEOCHEMICAL EXPLORATION
3887331 - METHOO FOR EVALUATING PETROLEUM RESERVOIRS
3930984 - COAL-ANTHRACENE OIL SLURRY LIQUEFIEO WITH CARBON MONOXIOE AND BARIUM-PROMOTEO CATALYSTS
4071433 - RECOVERY OF OIL FROM TAR SANOS
4071434 - RECOVERY OF OIL FROM TAR SANOS
4094767 - FLUIDIZED BEO RETORTING OF TAR SANOS

POLYGULF ASSOCIATES
4033852 - PROCESS FOR TREATING COAL ANO PROOUCTS PROOUCED THEREBY

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PULLMAN, INCORPORATED
3887437 - TUNNEL KILN FIRING OF CARBON PRODUCTS

RALPH M. PARSONS COMPANY
4050908 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM COAL
4055401 - REDUCING GAS GENERATOR
4115075 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM CARBONACEOUS MATERIALS

RECKLINGHAUSEN, CARL STILL, FIRMA
3846250 - COKE QUENCHING METHOD AND DEVICE

REDKER-YOUNG PROCESSES, INC.
4098649 - CONVERSION OF ORGANIC WASTE MATERIAL

RESEARCH COUNCIL OF ALBERTA
3505201 - SEPARATION OF COAL-OIL SUSPENSIONS

RESOURCES RESEARCH + DEVELOPMENT CORPORATION
3497005 - SONIC ENERGY PROCESS

REYNOLDS METALS COMPANY
4072599 - CARBON ELECTRODES HAVING STABILIZED BINDERS DERIVED FROM THE ENTIRE ORGANIC FRACTION OF BITUMINOUS COAL

RHEINISCHE BRAUNKOHLENWERKE AG
3671402 - FLUIDIZING BED COKING METHOD OF BROWN COAL
3791994 - METHOD OF PRODUCING ABSORPTION COKE FROM HIGH WATER CONTENT, BROWN COAL
3980447 - PROCESS FOR THE MANUFACTURE OF BROWN COAL BRIQUETTES

RIEDHAMMER, LUDWIG, GMBH
3822190 - CALCINING OF CARBON SUBSTANCES AND CARBONACEOUS ROCKS IN A TUNNEL KILN

RIO TINTO (RHODESIA) LIMITED
4076612 - PROCESS FOR OBTAINING LIQUID FUEL-OIL AND/OR GASEOUS HYDROCARBONS FROM SOLID CARBONACEOUS FEED STOCKS

ROBERTSON, EMILIA
3436312 - CARBONIZATION OF BAGASSE

ROCKWELL INTERNATIONAL CORPORATION
3708270 - PYROLYSIS METHOD
4092236 - MOLTEN SALT HYDROCONVERSION PROCESS

SAARBERGWERKE AKTIENGESELLSCHAFT
4123348 - PROCESS FOR CATALYTIC HYDROGENATION OF COAL
4123349 - SEPARATION OF SOLIDS CONTAINING RESIDUES FROM LIQUID FRACTIONS OF A COAL HYDROGENATION PROCESS USING AN EXPANSION ENGINE AND A PRESSURE RELEASE MEANS

SALEM CORPORATION
3470068 - METHODS AND APPARATUS FOR THE CONTINUOUS TREAT- MENT OF NON-CAKING COAL AND OTHER DISCRETE MATERIALS
3475286 - ROTARY HEAT TREATING OVEN
3536592 - ROTARY COKE QUENCHING APPARATUS
3770417 - SIMULTANEOUS PRODUCTION OF METALLIZED ORES AND COKE
3859172 - MULTIPLE RABBLED ROTARY HEARTH

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING
(CONTINUED)

SALEM CORPORATION
3998703 - METHOD OF TREATING MATERIALS ON A ROTARY HEARTH

SALEM FURNACE CO.
4096038 - METHOD AND APPARATUS FOR OPERATING A CALCINER UNDER A PRESSURE DIFFERENTIAL

SANYO KOKUSAKU PULP CO., LTD.
3971705 - METHOD OF PRODUCING CHAR FROM PULP MANUFACTURING WASTE LIQUOR

SAYLER; WILLIAM H.
4011303 - PROCESS FOR DESULFURIZING SULFUR-BEARING COKE

SCIENTIFIC RESEARCH INSTRUMENTS CORPORATION
3801469 - METHOD FOR EFFECTING CHEMICAL REACTIONS BETWEEN CASCADING SOLIDS AND COUNTERFLOWING GASES OR FLUIDS

SETECH INTERNATIONAL LIMITED
4125578 - RECLAIMED VULCANIZED RUBBER

SHELL CANADA LIMITED
4035282 - PROCESS FOR RECOVERY OF BITUMEN FROM A BITUMINOUS FROTH

SHELL OIL COMPANY
3459653 - FILTRATION OF SOLVENT-WATER EXTRACTED TAR SAND
3475318 - SELECTIVE SOLVENT EXTRACTION PLUS FILTRATION OF TAR SANDS
3502564 - HYDROPROCESSING OF COAL
3527691 - PROCESS FOR CONVERSION OF COAL
3527692 - SIMULTANEOUS PIPELINE TRANSPORTATION AND RECOVERY OF OIL FROM OIL SHALE
3532617 - HYDROCONVERSION OF COAL WITH COMBINATION OF CATALYSTS
3542665 - PROCESS OF CONVERTING COAL TO LIQUID PRODUCTS
3542666 - ADJUSTMENT OF PH IN THE FILTRATION OF TAR SAND SOLVENT-WATER SYSTEMS
3547803 - RECOVERY OF OIL FROM BITUMINOUS SANDS
3549512 - PROCESS FOR CONVERSION OF COAL
3553098 - RECOVERY OF TAR FROM TAR SANDS
3553099 - PROCESS FOR EXTRACTING TAR FROM TAR SAND
3575842 - RECOVERING TAR FROM TAR SAND
3634225 - PROCESS FOR RETORTING OIL-BEARING SHALE
3640849 - SPENT SHALE RETORT WITH SONIC OSCILLATOR CLINKER CUTTER
3657108 - REGENERATION OF METAL HALIDE CATALYST
3663452 - HYDROGENATION CATALYST
3668109 - PROCESS FOR HYDROCONVERSION OF ORGANIC MATERIALS
3677932 - MOLTEN SALT HYDROCONVERSION PROCESS
3679577 - MOLTEN SALT HYDROFINING PROCESS
3695354 - HALOGENATING EXTRACTION OF OIL FROM OIL SHALE
3725239 - HYDROGENATION CATALYST AND PROCESS
3764515 - PROCESS FOR HYDROCRACKING HEAVY HYDROCARBONS
3790468 - HYDROCRACKING OF COAL IN MOLTEN ZINC IODIDE
3790469 - HYDROCRACKING COAL IN MOLTEN ZINC IODIDE
3824178 - HYDROCRACKING PETROLEUM AND RELATED MATERIALS
3824179 - HYDROCRACKING PETROLEUM AND RELATED MATERIALS BY HOMOGENEOUS CATALYSIS
3844928 - HYDROCRACKING HEAVY HYDROCARBONACEOUS MATERIALS IN MOLTEN ZINC IODIDE
3925189 - PIPELINE PROCESSING OF OIL-CONTAINING SOLIDS TO RECOVER HYDROCARBONS
4110193 - PROCESS FOR PRODUCTION OF HYDROCARBONACEOUS FLUIDS FROM SOLIDS SUCH AS COAL AND OIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SHIRCO, LTD.
4050900 - INCINERATION APPARATUS

SHOILCO, INC.
4130474 - LOW-TEMPERATURE OIL SHALE AND TAR SAND EXTRACTION PROCESS

SHOWA DENKO KABUSHIKI KAISHA
3547804 - PROCESS FOR PRODUCING HIGH GRADE PETROLEUM COKE

SINCLAIR OIL CORPORATION
3532618 - POUR POINT DEPRESSANT MADE BY HYDROVISBREAKING AND DEASPHALTING A SHALE OIL

SINCLAIR RESEARCH INC.
3516787 - RECOVERY OF OIL AND ALUMINUM FOR OIL SHALE
3524806 - PROCESS OF MAKING LARGE COKE PARTICLES

SIRMAC LTD.
3960768 - PRODUCTION OF CARBON BY ELIMINATING HYDROGEN HALIDE FROM POLYMERIZED HALOHYDROCARBONS

SOCIETE ANONYME ACTIVIT
3677727 - PROCESS OF ACTIVATION AND GASIFICATION OF FLUIDISED CARBONACEOUS MATERIALS

SOUTH AFRICAN COAL, OIL + GAS CORPORATION LIMITED
4036730 - SOLVENT-REFINING OF COAL
4045187 - CARBONACEOUS MATERIAL

STAMICARBON N.V.
3479251 - PROCESS FOR THE PRODUCTION OF MOLDED OBJECTS

STANDARD OIL COMPANY (INDIANA)
4005005 - PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM TAR SANDS
4117886 - OIL SHALE RETORTING AND OFF-GAS PURIFICATION

STANDARD OIL COMPANY
3565751 - METHOD FOR PYROLYSIS AND CATALYTIC HYDROGENATION
3630959 - CARBONIZATION OF BITUMINOUS COALS
3642657 - PRODUCTION OF ACTIVE CARBONS FROM AROMATIC CARBOXYLIC ACIDS, PETROLEUM COKE ACID OR FROM POROUS CARBONS
3658654 - SCREW-CONVEYING RETORTING APPARATUS WITH HYDROGENATION MEANS
3715303 - HYDROTREATMENT OF FOSSIL FUELS
3726808 - PROCESS FOR THE PRODUCTION OF ACTIVE CARBONS
3948754 - PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM OIL SHALE AND TAR SANDS
3948755 - PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM OIL SHALE AND TAR SANDS
3983027 - PROCESS FOR RECOVERING UPGRADED PRODUCTS FROM COAL
3983028 - PROCESS FOR RECOVERING UPGRADED PRODUCTS FROM COAL
3988238 - PROCESS FOR RECOVERING UPGRADED PRODUCTS FROM COAL
3994829 - PROCESS FOR PRODUCTION OF ACTIVATED CARBON
4055480 - MULTI-PHASE SEPARATION METHODS AND APPARATUS
4067796 - TAR SANDS RECOVERY PROCESS

STEAG AG
4111665 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL, ESPECIALLY OF FINE COAL IN A GENERATOR

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

STORA KOPPARBERGS BERGSLAGS AB
4026679 - APPARATUS FOR AND PROCESS OF CONVERTING CARBONACEOUS MATERIALS CONTAINING SULPHUR TO AN ESSENTIALLY SULPHUR-FREE COMBUSTIBLE GAS

SUMIKIN COKE COMPANY LIMITED
4100031 - PROCESS FOR PREPARING BLAST FURNACE COKES

SUMITOMO ELECTRIC INDUSTRIES, LTD.
3984288 - METHOD FOR TREATMENT OF RUBBER AND PLASTIC WASTES

SUMITOMO METAL INDUSTRIES, LTD.
3883399 - CHARGING COKE OVEN BLENDED COAL AND AN OVERLAY OF BRIQUETTES
3907648 - METHOD OF MANUFACTURING FORMED COKE FOR BLAST FURNACES WITHOUT CAUSING THE FUSION OF THE COKE

SUMITOMO SHIPBUILDING + MACHINERY CO., LTD.
4008147 - METHOD FOR TREATMENT OF HEAVY FRACTION RECOVERED THROUGH THERMAL CRACKING OF HIGH MOLECULAR-WEIGHT HYDROCARBONACEOUS MATERIALS

SUNOCO ENERGY DEVELOPMENT CO.
4018682 - FREEZE-THAW METHOD FOR REDUCING MINERAL CONTENT OF A CLAY-WATER MIXTURE

SUN OIL COMPANY OF PENNSYLVANIA
3449211 - APPARATUS FOR PYROLYSIS OF SOLIDS
3464892 - TUNNEL OVEN WITH A SERIES OF MOVING BARGES AND SEPARATE COMPARTMENTS
3481720 - PROCESS AND APPARATUS FOR THE DISTILLATION OF SOLIDS
3487002 - RETORTING OF BITUMINOUS SANDS
3509037 - TAR SAND SEPARATION PROCESS USING SOLVENT, HOT WATER AND CORRELATED CONDITIONS
3518181 - PYROLYTIC METHODS OF TREATING BITUMINOUS TAR SANDS AND PREHEATING OF THE SAME
3594305 - PROCESS FOR HYDROGENATION OF COAL
3623972 - TAR SAND RETORTING
3642607 - COAL DISSOLUTION PROCESS
3663421 - CONTINUOUS, FLUIDIZED PROCESS AND SYSTEM FOR THERMAL RECOVERY OF HYDROCARBONACEOUS
3687838 - COAL DISSOLUTION PROCESS
3729407 - HYDROGENATION PROCESS UTILIZING RECOVERED CATALYST
3954415 - VESSEL FOR EXTRACTING BITUMEN FROM TAR SANDS
3963599 - RECOVERY OF BITUMEN FROM AQUEOUS STREAMS VIA SUPERATMOSPHERIC PRESSURE AERATION

SUN RESEARCH AND DEVELOPMENT COMPANY
3819506 - COAL DISSOLVING PROCESS
3920536 - COAL DISSOLVING PROCESS

SUNTECH, INC.
4021329 - PROCESS FOR DISSOLVING SUB-BITUMINOUS COAL

SUPERIOR OIL COMPANY
3821353 - SHALE OIL AND MINERAL RECOVERY PROCESS
3962403 - PROCESS FOR SEPARATION OF NAHCOLITE FROM OIL SHALE
4058905 - METHOD FOR REDUCING RESIDENCE TIME AND ELIMINATING GAS LEAKAGE BETWEEN ZONES IN A CROSS-FLOW DEVICE FOR HEATING AND COOLING SOLIDS
4082645 - RECOVERY OF HYDROCARBON VALUES BY CONTROLLED EDUCTION AND OXIDATION OF OIL SHALE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SYNGAS RECYCLING CORPORATION
4005994 - PROCESS AND APPARATUS FOR CONVERTING SOLID WASTES TO PIPELINE GAS

SYRACUSE UNIVERSITY RESEARCH CORPORATION
3850477 - CHEMICAL COMMINUTION AND MINING OF COAL

TAKEDA CHEMICAL INDUSTRIES LTD.
3541025 - PROCESS FOR PRODUCING ACTIVATED CARBON IN AN ASCENDING TURNING CURRENT OF ACTIVATING GAS
3676365 - METHOD FOR MANUFACTURING ACTIVATED CARBON AND APPARATUS THEREFOR
3852216 - PROCESS FOR PRODUCING COARSE PARTICLES OF ACTIVE CARBON IN A FLUIDIZED BED WITH ADDED INERT PARTICLES
4007014 - ACTIVATED CARBON REVIVIFICATION EQUIPMENT

TAKUMA KIKAN MFG. CO.
3716339 - HYDROGEN CHLORIDE RECOVERY INCINERATOR FOR PLASTICS CONTAINING HYDROGEN AND CHLORINE

TECHNIKOIL, INC.
3442789 - SHALE OIL RECOVERY PROCESS

TEXACO DEVELOPMENT CORPORATION
4099932 - CONVERSION OF SOLID FUELS TO FLUID FUELS

TEXACO INC.
3554286 - RECOVERY OF HYDROCARBONS FROM SUBTERRANEAN HYDROCARBON-BEARING FORMATIONS
3558426 - TREATMENT OF WASTE LIQUORS FROM PULP AND PAPER MILLS
3565784 - HYDROTORTING OF SHALE TO PRODUCE SHALE OIL
3581823 - RECOVERY OF HYDROCARBONS FROM SUBTERRANEAN HYDROCARBON-BEARING FORMATIONS
3595965 - PURIFICATION OF PETROLEUM COKE
3598528 - PURIFICATION OF PETROLEUM COKE
3617469 - HYDROTORTING OF SHALE TO PRODUCE SHALE OIL
3617470 - HYDROTORTING OF SHALE TO PRODUCE SHALE OIL
3617471 - HYDROTORTING OF SHALE TO PRODUCE SHALE OIL
3617472 - PRODUCTION OF SHALE OIL
3671403 - PROCESS FOR COKING PUMPABLE ANIMAL AND DAIRY WASTES
3705077 - WASTE DISPOSAL PROCESS FOR SPENT WOOD-PULPING LIQUORS
3715301 - MULTI-HYDROTORTING OF COAL
3846276 - PROCESS FOR SEPARATING BITUMEN FROM TAR SAND RECOVERED FROM DEPOSITS BY MINING
3855069 - FORMATION REDUCTION IN PRESSURE COKING EQUIPMENT
3864254 - SEWAGE TREATMENT UNIT
3876538 - PROCESS FOR DISPOSING OF AQUEOUS SEWAGE AND PRODUCING FRESH WATER
3899398 - PROCESS FOR TREATING CITRUS WASTES TO OBTAIN WATER INSOLUBLE ESSENTIAL OILS
3962076 - PROCESS FOR CONVERTING AQUEOUS SEWAGE TO POTABLE WATER
3993555 - METHOD OF SEPARATING BITUMEN FROM TAR SAND WITH COLD SOLVENT
4014661 - FUEL MAKING PROCESS
4030981 - PROCESS FOR MAKING OIL FROM AQUEOUS REACTIVE SLUDGES AND SLURRIES
4047898 - UPGRADING OF SOLID FUELS
4052169 - TREATMENT OF SOLID FUELS
4067767 - LIQUID PHASE COKING OF SPENT KRAFT PULPING LIQUORS
4083696 - PROCESS FOR DESULFURIZING PIPELINED COAL
4102749 - PROCESS FOR MAKING OIL FROM AQUEOUS REACTIVE SLUDGES AND SLURRIES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

THAGARD TECHNOLOGY COMPANY
4042334 - HIGH TEMPERATURE CHEMICAL REACTOR
4057396 - FLUID-WALL REACTOR FOR HIGH TEMPERATURE CHEMICAL REACTION PROCESSES

TIDEWATER OIL COMPANY
3472622 - DESULFURIZATION OF COKE
3472624 - DESULFURIZATION OF PARTICULATE COKE

TORRAX SYSTEMS, INC.
3702039 - PRODUCTION OF USABLE PRODUCTS FROM WASTE MATERIAL

TOTAL ENERGY CORPORATION
3839191 - HYDROCRACKING OF COAL LIQUIDS

TRW INC.
3768988 - REMOVAL OF PYRITIC SULFUR FROM COAL USING SOLUTIONS CONTAINING FERRIC IONS
3926575 - REMOVAL OF PYRITIC SULFUR FROM COAL

TWENTY FARMS, INC.
4088562 - METHOD AND APPARATUS FOR PROCESSING OIL SHALE

UNION CARBIDE CORPORATION
3985820 - CRACKING PROCESS
3988236 - PROCESS FOR THE CONTINUOUS HYDROCARBONIZATION OF COAL
3988237 - INTEGRATED COAL HYDROCARBONIZATION AND GASIFICATION OF CHAR
4002535 - PRECONDITIONING TREATMENT OF COAL TO MINIMIZE AGGLOMERATION
4061600 - GRAPHITE ELECTRODE AND METHOD OF MAKING

UNION OIL COMPANY OF CALIFORNIA
3677533 - METHOD OF USING A COKE PREHEATER
3759795 - CALCINER-PREHEATER
4003797 - SUPERATMOSPHERIC PRESSURE SHALE RETORTING PROCESS
4004982 - SUPERATMOSPHERIC PRESSURE SHALE RETORTING PROCESS
4010092 - OIL SHALE RETORTING-GASIFICATION PROCESS
4016239 - RECARBONATION OF SPENT OIL SHALE
4025416 - SHALE RETORTING PROCESS
4043897 - OIL SHALE RETORTING
4069132 - OIL SHALE RETORTING PROCESS WITH DESULFURIZATION OF FLUE GAS
4083770 - USE OF CONTROL SYSTEM FOR GAS-SOLIDS CONTACTING PROCESSES
4127469 - OIL SHALE RETORTING PROCESS

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND, -
3849332 - SEQUENTIAL CARBONIZATION AND ACTIVATION OF FIBROUS MATERIAL IN A CARBON DIOXIDE ATMOSPHERE

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3914392 - HIGH TEMPERATURE INSULATING CARBONACEOUS MATERIAL
3929585 - PRODUCTION OF CHARCOAL FROM SAWDUST IN A FLUIDIZED BED
3945809 - METHOD AND APPARATUS FOR REMOVING COARSE UNENTRAINED CHAR PARTICLES FROM THE SECOND STAGE OF A TWO-STAGE COAL GASIFIER
3957460 - OXIDATION OF COAL-WATER SLURRY FEED TO HYDROGASIFIER
3963598 - FLASH HYDROGENATION OF COAL
3970434 - PROCESS FOR REDUCING SULFUR IN COAL CHAR
3981690 - AGGLOMERATING COMBUSTOR-GASIFIER METHOD AND APPARATUS FOR COAL GASIFICATION
3993458 - METHOD FOR PRODUCING SYNTHETIC FUELS FROM SOLID WASTE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY (CONTINUED)
4011153 - LIQUEFACTION AND DESULFURIZATION OF COAL USING SYNTHESIS GAS
4018654 - PRETREATMENT OF COAL OURING TRANSPORT
4018663 - COAL LIQUEFACTION PROCESS
4035152 - DISTRIBUTION PLATE FOR RECIRCULATING FLUIDIZEO BED

UNITED STATES OF AMERICA HEALTH EOUCATION ANO WELFARE, MESNE
3829558 - OISPOSAL OF WASTE PLASTIC AND RECOVERY OF VALUABLE PROOUCTS THEREFROM

UNITED STATES OF AMERICA, INTERIOR
3424556 - PROOUCTION OF CARBON BLACK FROM COAL
3455789 - PROCESS FOR CONTINUOUS CARBONIZATION OF COAL
3463623 - PROCESS FOR GASIFYING CAKING COALS
3477942 - HYOROCARBON FUELS FROM COAL OR ANY CARBONACEOUS MATERIAL
3523886 - PROCESS FOR MAKING LIQUID FUELS FROM COAL
3540995 - H-COAL PROCESS: SLURRY OIL SYSTEM
3556978 - HYOROGASIFICATION OF CARBONACEOUS MATERIAL
3565766 - COPYROLYSIS OF COAL ANO HEAVY CARBONACEOUS RESIDUE
3577337 - SOLVENT EXTRACTION OF COAL
3629159 - REGENERATQON OF SPENT ZINC HALIOE CATALYST USING PRELIMINARY HIGH PRESSURE HYOROGEN SOLVENT EXTRACTION
3642433 - PROCESS FOR EXTRACTING ALUMINUM COMPOUNOS FROM OAWSONITE ANO OAWSONITIC OIL SHALE
3668145 - PRODUCTION ACTIVATED CARBON IN OUAL PULSE JET ENGINE SYSTEM
3733255 - CONVERSION OF MUNICIPAL REFUSE, SEWAGE SLUOGE ANO OTHER WASTES TO HEAVY OIL OR BITUMEN
3736250 - CATALYTIC HYDROGENATION USING A KCL-ZNCL/2\ MOLTEN SALT MIXTURE AS A CATALYST
3808119 - PROCESS FOR REFINING CARBONACEOUS FUELS
3817723 - TWO-STAGE GASIFICATION OF PRETREATEO COAL
3840456 - PROOUCTION OF LOW-SULFUR FUEL FROM SULFUR-BEARING COALS ANO OILS
3884794 - SOLVENT REFINEO COAL PROCESS INCLUDING RECYCLE OF COAL MINERALS
3884795 - SOLVENT REFINEO COAL PROCESS WITH ZONES OF INCREASING HYDROGEN PRESSURE
3884796 - SOLVENT REFINEO COAL PROCESS WITH RETENTION OF COAL MINERALS
3892654 - OUAL TEMPERATURE COAL SOLVATION PROCESS
3993455 - REMOVAL OF MINERAL MATTER INCLUDING PYRITE FROM COAL

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE AOM
4121995 - SURFACTANT-ASSISTED LIQUEFACTION OF PARTICULATE CARBONACEOUS SUBSTANCES

UNITED STATES OF AMERICA, TENNESSEE VALLEY AUTHORITY
3996022 - CONVERSION OF WASTE RUBBER TO FUEL ANO OTHER USEFUL PROOUCTS

UNITED STATES STEEL CORPORATION
3432396 - METHOD OF CLEARING TAR ACCUMULATIONS FROM A COKE- OVEN COLLECTOR MAIN
3441497 - JET FUELS FROM HYDROGENATED COAL TAR OERIVATIVES AND PINANE-CONTAINING MATERIALS
3647053 - APPARATUS FOR AND METHOD OF COLLECTING SMOKE FROM COKE OVENS OURING CHARGING
3755136 - SYSTEM FOR REMOVING SOLIDS FROM COAL LIQUEFACTION REACTOR EFFLUENTS
3790448 - METHOD OF PURIFYING WASTE FLUID
3806425 - QUENCHING COKE WITH SOLIO STREAMS AND AVOIDING FLOOOING
3980525 - INCREASING ETHYLENE FEEOSTOCK GASES PROOUCEO BY QUENCHING EFFLUENT ZONE ABOVE COKE BEO WITH COOLING LIQUID
4025395 - METHOO FOR QUENCHING COKE
4077848 - METHOD ANO APPARATUS FOR APPLYING PATCHING OR SEALING COMPOSITIONS TO COKE OVEN SIOE WALLS ANO ROOF
4094746 - COAL-CONVERSION PROCESS
4104129 - LOW TEMPERATURE CARBONIZATION ANO DESULFURIZATION OF COAL UNOER ELEVATEO PRESSURES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNIVERSITY OF CALIFORNIA, THE REGENTS OF
3639111 - METHOO ANO APPARATUS FOR PREVENTING FORMATION OF ATMOSPHERIC POLLUTANTS IN THE COMBUSTION OF ORGANIC MATERIAL
3761568 - METHOO AND APPARATUS FOR THE DESTRUCTIVE OECOMPOSITION OF ORGANIC WASTES WITHOUT AIR POLLUTION AND WITH RECOVERY OF CHEMICAL BYPROOUCTS
3962044 - HEAT TREATING EXCRETA ANO PROOUCTS THEREOF

UNIVERSITY OF UTAH
3754076 - PROOUCTION OF SILICON CARBIOE FROM RICE HULLS
4120776 - SEPARATION OF BITUMEN FROM DRY TAR SANOS

UNIVERSITY OF WYOMING
3505204 - DIRECT CONVERSION OF CARBONACEOUS MATERIAL TO HYOROCARBONS

UOP INC.
3477941 - METHOO OF TREATING COAL
3488278 - PROCESS FOR THE TREATING COAL
3503863 - COAL LIQUEFACTION PROCESS
3503864 - COAL LIQUEFACTION METHOO
3503865 - COAL LIQUEFACTION PROCESS
3505202 - SOLVENT EXTRACTION METHOD
3505203 - SOLVENT EXTRACTION METHOD
3520794 - SOLVENT EXTRACTION METHOD
3524820 - PREPARATION OF RARE EARTH METAL EXCHANGED CRYSTALLINE ALUMINO SILICATES
3535224 - COAL LIQUEFACTION PROCESS
3536608 - COAL LIQUEFACTION PROCESS
3583900 - COAL LIQUEFACTION PROCESS BY THREE-STAGE SOLVENT EXTRACTION
3598717 - METHOO FOR LIQUEFYING COAL
3598718 - SOLVENT EXTRACTION OF COAL
3671418 - COAL LIQUEFACTION PROCESS USING ASH AS A CATALYST
3705092 - SOLVENT EXTRACTION OF COAL BY A HEAVY OIL
3707461 - HYOROCRACKING PROCESS USING A COAL-DERIVEO ASH
3796650 - COAL-LIQUEFACTION PROCESS
3813329 - SOLVENT EXTRACTION OF COAL UTILIZING A PETEROPOLY ACIO CATALYST
3839186 - PROCESS FOR PROOUCING VOLATILE HYDROCARBON PROOUCTS FROM COAL ANO HYDROGEN
3846275 - COAL LIQUEFACTION PROCESS
3849287 - COAL LIQUEFACTION PROCESS
3864096 - PROCESS FOR CONVERTING CELLULOSE
3864097 - PROCESS FOR CONVERTING CELLULOSE
3867275 - COAL LIQUEFACTION PROCESS
3909390 - COAL LIQUEFACTION PROCESS
3910834 - MOVING BEO REACTOR CONVERSION PROCESS FOR PARTICULATE CONTAINING HYOROCARBONS SUCH AS SHALE OIL ANO TAR-SANOS OIL
3925188 - PROOUCTION OF HYOROGEN FOR USE IN COAL LIQUEFACTION
3997425 - PROCESS FOR THE LIQUEFACTION OF COAL
4079004 - METHOO FOR SEPARATING UNOISSOLVEO SOLIOS FROM A COAL LIQUEFACTION PROOUCT
4079005 - METHOD FOR SEPARATING UNDISSOLVEO SOLIDS FROM A COAL LIQUEFACTION PROOUCT
4081358 - PROCESS FOR THE LIQUEFACTION OF COAL ANO SEPARATION OF SOLIOS FROM THE LIQUIO PROOUCT
4081359 - PROCESS FOR THE LIQUEFACTION OF COAL ANO SEPARATION OF SOLIOS FROM THE LIQUIO PROOUCT
4081360 - METHOO FOR SUPPRESSING ASPHALTENE FORMATION OURING COAL LIQUEFACTION ANO SEPARATION OF SOLIDS FROM THE LIQUIO PROOUCT
4082643 - PROCESS FOR THE LIQUEFACTION OF COAL AND SEPARATION OF SOLIOS FROM THE PROOUCT STREAM
4082644 - PROCESS FOR THE LIQUEFACTION OF COAL ANO SEPARATION OF SOLIDS FROM THE PROOUCT STREAM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

URBAN RESEARCH DEVELOPMENT CORPORATION
3926582 - METHOD AND APPARATUS FOR PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS
3956076 - PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS TO FORM CERAMIC PRILLS

VEB LEUNA-WERKE WALTER ULBRICHT
3441628 - PROCESS FOR PRODUCING WAXLIKE LOW MOLECULAR ETHYLENE POLYMERS AND COPOLYMERS

VERKAUFSGESELLSCHAFT FUR TEERERZEUGNISSE (VFT)
4031189 - PROCESS FOR PREPARING COMPOSITION CONTAINING CARBON AND LOW SULFUR, NITROGEN AND ASH CONTENT

WALLACE-ATKINS OIL CORPORATION
4038152 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WASTE MATERIAL

WALLACE ENERGY CONVERSION, INC.
4118282 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF HIGH MOLECULAR WEIGHT ORGANIC MATERIALS

WATERFRONT N.V.
4122036 - METHOD OF PYROLYZING SEWAGE SLUDGE TO PRODUCE ACTIVATED CARBON

WENZEL, WERNER
3725038 - PROCESS FOR MAKING POLYGON COKE IN COKING CHAMBERS AND COKE SO PRODUCED
4106996 - METHOD OF IMPROVING THE MECHANICAL RESISTANCE OF COKE

WESTERN OIL SANDS LTD.
4054505 - METHOD OF REMOVING BITUMEN FROM TAR SAND FOR SUBSEQUENT RECOVERY OF THE BITUMEN
4054506 - METHOD OF REMOVING BITUMEN FROM TAR SAND UTILIZING ULTRASONIC ENERGY AND STIRRING

WESTVACO CORPORATION
3647716 - TRANSPORT REACTOR WITH A VENTURI/TUBE CONNECTION TO A COMBUSTION CHAMBER FOR PRODUCING ACTIVATED CARBON
3843559 - PROCESS FOR MAKING ACTIVATED CARBON FROM AGGLOMERATIVE COAL WITH WATER INJECTION TEMPERATURE CONTROL IN A FLUIDIZED OXID ATION STAGE
3886093 - ACTIVATED CARBON WITH ACTIVE METAL SITES AND PROCESS FOR PRODUCING SAME
3951856 - PROCESS FOR MAKING ACTIVATED CARBON FROM AGGLOMERATIVE COAL
4002533 - TWO-STEP PROCESS FOR CONDITIONING SIZED COAL AND RESULTING PRODUCT

WILPUTTE CORPORATION
3933595 - OVEN DOOR FUME COLLECTION SYSTEM
3956073 - COKE OVEN GAS AND LIQUOR COLLECTING APPARATUS
4010079 - COKE OVEN CHARGING GAS CLEANING AND COLLECTING APPARATUS AND PROCESS
4104128 - APPARATUS AND METHOD FOR RECOVERY OF COAL FINES

WISE COAL + COKE COMPANY
3594286 - CARBONIZING MULTIPLE LAYERS OF MATERIAL BY MAINTAINING REDUCING ATMOSPHERE IN BED AND OXIDIZING ATMOSPHERE ABOVE BED

WORMSER ENGINEERING, INC.
4051791 - COAL BURNING ARRANGEMENT

SOCIETE FRANCAISE D ETUDE D INSTALLATIONS SIDERURGIQUES
4036603 - APPARATUS FOR REMOVING SOLID MATTER FROM COAL TAR

STANDARD OIL COMPANY (OHIO)
3704224 - PROCESS FOR MANUFACTURE OF IMPROVED NEEDLE COKE FROM PETROLEUM

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BACON	CONRAD	G.	2960 HANNAH AVE.	NORRISTOWN	PA	19403
4125437 - DISTILLATION SYSTEM						
BARCELLOS	EDUARDO	DA	AVENIDA ATLANTICA 290 APT. 92	RIO DE JANEIRO		BR
4060479 - PROCESS FOR OBTAINING OIL, GAS, SULFUR AND OTHER PRODUCTS FROM OIL SHALE						
BLAINE	GENEVA		26007 S. LUCILLE AVE.	LOMITA	CA	90717
4046669 - SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A TRICHLOROETHYLENE SOLVENT						
4057485 - SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A CHLORINATED ETHANE SOLVENT						
BLAINE	NEAL	FRANKLIN	26007 S. LUCILLE AVE.	LOMITA	CA	
4046669 - SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A TRICHLOROETHYLENE SOLVENT						
BLAINE	NEIL	FRANKLIN	26007 S. LUCILLE AVE.	LOMITA	CA	
4057485 - SOLVENT EXTRACTION OF OIL FROM TAR SANDS UTILIZING A CHLORINATED ETHANE SOLVENT						
BLEILER	KENNETH	W.	223 CRESTVIEW ROAD	HATBORO	PA	19040
4076607 - PROCESS FOR COAL DESULFURIZATION						
BRIMHALL	GARY	C.	2915 BRANCH DRIVE	SALT LAKE CITY	UT	84117
4017377 - PROCESS AND FLUID MEDIA FOR TREATMENT OF TAR SANDS TO RECOVER OIL						
BRIMHALL	GEORGE	H.	435 MIRADA ROAD	HALF MOON BAY	CA	94109
4050907 - ORGANIC WASTE TREATING AND CONVERSION SYSTEM						
CALDERON	ALBERT		1065 MELROSE DRIVE	BOWLING GREEN	OH	43402
3972780 - POLLUTION CONTROL OF COKE OVENS						
3984310 - APPARATUS AND METHOD FOR MINIMIZING ACCUMULATION OF DEPOSITS BETWEEN THE DOOR AND JAMB OF A COKE OVEN AND FOR HEATING THE ENDS OF THE COKE OVEN						
CAUGHEY	ROBERT	A.	CLINTON ROAD	ANTRIM	NH	03440
4030895 - APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS						
CHIA	TUNG-YU		32-50, 70TH ST., APT. 5J	EAST ELMHURST	NY	11370
3988120 - METHOD OF DESULFURIZING COAL						
DONATH	ERNEST	E.	P.O. BOX 1068	CHRISTIANSTED, ST. C	VI	00820
3991557 - PROCESS FOR CONVERTING HIGH SULFUR COAL TO LOW SULFUR POWER PLANT FUEL						
4094651 - PROCESS FOR PSEUDOHYDROSTATIC FEEDING OF SOLIDS INTO A REACTOR						
FAIRBANKS	JOHN	B. JR.	3927 S. 3030 EAST	SALT LAKE CITY	UT	84106
4017377 - PROCESS AND FLUID MEDIA FOR TREATMENT OF TAR SANDS TO RECOVER OIL						
FUNK	HARALD	F.	68 ELM ST.	MURRAY HILL	NJ	07974
3970524 - TREATING WASTE MATERIALS TO PRODUCE USABLE GASES						
GIFFORD	PHILLIP	H. JR.	MARBLE STAR ROUTE	CARBONDALE	CO	81623
4001105 - HYDROCRACKING PROCESS FOR THE PRODUCTION OF SYNTHETIC FUELS						
GRAY	FRANK	ALEXANDER	169 FIFTH ST.	TORONTO, ONTARIO		CA
3891550 - PROCESS AND APPARATUS FOR RECOVERING BITUMEN FROM BITUMINOUS SANDS						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
GRAY	JOHN	ADAM	169 FIFTH ST.	TORONTO, ONTARIO		CA
3891550 - PROCESS AND APPARATUS FOR RECOVERING BITUMEN FROM BITUMINOUS SANDS						
GRIFFITH	JOSEPH	W.	8705 SW. WHITE COURT	PORTLAND	OR	97225
4052266 - METHOD AND APPARATUS FOR PURIFYING PROCESS WASTE EMISSIONS						
HAGSTROM	ROBERT	G.	2401 STERLING RD.	NASHVILLE	TN	37215
3870652 - PRODUCTION OF ACTIVATED CHAR USING A MOVING GRATE STOKER FURNACE						
HAHN	HANS	HELMUT	38 MARAIS ST.	BAILEY'S MUCKLENEUK,		ZA
4053569 - UPGRADING COAL FOR COKING PURPOSES						
HALL	ROBERT	N.	3578 PERADA DRIVE	WALNUT CREEK	CA	94598
3976558 - METHOD AND APPARATUS FOR PYROLYZING OIL SHALE						
HANSON	LESTER		1903 PRINCETON AVE.	SALT LAKE CITY	UT	84108
4065361 - APPARATUS AND SYSTEM FOR PROCESSING OIL SHALE						
HARENDZA-HARINXMA	ALFRED	J.	50 MERION PLACE	LAWRENCEVILLE	NJ	08648
3961025 - METHOD OF CARBONIZING A SUBSTANCE COMPRISING CELLULOSE						
HELLEUR	DONALD	EDMUND	221 MORTLAKE AVENUE	ST. LAMBERT, QUEBEC		CA
4079585 - METHOD AND APPARATUS FOR REMOVING VOLATILE FLUIDS						
HOLTER	HEINZ		BEISENSTRASSE 39-41	GLADBECK		DE
4100033 - EXTRACTION OF CHARGE GASES FROM COKE OVENS						
JABLIN	RICHARD		1438 MANOR LANE	BLUE BELL	PA	19422
4066513 - COKE QUENCHING STEAM GENERATOR						
JONES	JOHN	B. JR.	300 ENTERPRISE BUILDING	GRAND JUNCTION	CO	81501
4042485 - COMBUSTON METHOD OF OIL SHALE RETORTING						
KAUTZ	WALTER	C. JR.	21707 NW. 51ST AVE.	RIDGEFIELD	WA	98646
4050991 - PYROLYTIC REDUCER AND CONDENSER APPARATUS						
KEMP	KLAUS	M.	2410 ANACAPA ST.	SANTA BARBARA	CA	93105
3945890 - CONVERTER SYSTEM						
4052265 - PROCESS FOR THE PYROLYTIC TREATMENT OF ORGANIC, PSEUDO-ORGANIC AND INORGANIC MATERIAL						
KIENER	KARL		7081 GOLDSHOFE	OSTALBKREIS		DT
4028068 - PROCESS AND APPARATUS FOR THE PRODUCTION OF COMBUSTIBLE GAS						
KILBURN	JAMES	S.	3060 B-1/2 RD.	GRAND JUNCTION	CO	81501
4121662 - WATER PURIFICATION WITH FRAGMENTED OIL SHALE						
KIRKBRIDE	CHALMER	G.	13 ELK FOREST, R.D. #2	ELKTON	MD	21921
4123230 - SULFUR REMOVAL FROM COAL						
KOPPELMAN	EDWARD		4424 BERGAMO DR.	ENCINO	CA	91316
4127391 - PROCESS FOR MAKING COKE FROM BITUMINOUS FINES AND FUELS PRODUCED THEREFROM						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
KOPPELMAN	EDWARD		4424 BERGAMO DR.	ENCINO	CA	91316
4129420 - PROCESS FOR MAKING COKE FROM CELLULOSIC MATERIALS AND FUELS PRODUCED THEREFROM						
LEAS	ARNOLD	MARCEL	P.O. BOX 429	COLUMBIA CITY	IN	46725
4007108 - CONVERTING SOLID FUELS TO GASEOUS AND LIQUID FUELS						
LEAS	ARNOLD	MARCEL	115 S. LINE ST.	COLUMBIA CITY	IN	46725
4008145 - CONVERTING SOLID FUELS TO GASEOUS AND LIQUID FUELS						
LOHRMANN	HUGO		HOLZHAUERTHALSTRASSE	NEUNKIRCHEN-HEINITZ		DT
3933443 - COKING COMPONENT						
LONG	RAYMOND	H.	POST HOUSE RD., MAIL RT. 18	MORRISTOWN	NJ	07960
3878051 - DESULFURIZING COKE WITH PHOSGENE OR A MIXTURE OF CARBON MONOXIDE AND CHLORINE						
MACDONALD	JAMES	E.	R.D. 4, BOX 93	LATROBE	PA	15650
3912597 - SMOKELESS NON-RECOVERY TYPE COKE OVEN						
MALEK	JOHN	M.	P.O. BOX 71	LOMITA	CA	90717
4056460 - PROCESS FOR LIQUEFYING CARBONACEOUS MATERIALS OF HIGH MOLECULAR WEIGHT AND FOR SEPARATING LIQUEFACTION PRODUCTS						
4085029 - METHOD FOR SEPARATING LIQUID AND SOLID PRODUCTS OF LIQUEFACTION OF COAL OR LIKE CARBONACEOUS MATERIALS						
MALEK	JOHN	MICHAEL	P.O. BOX 2870	PASADENA	CA	91105
4057484 - PROCESS FOR HYDROLIQUEFYING COAL OR LIKE CARBONACEOUS SOLID MATERIALS						
MATOVICH	EDWIN			BREA	CA	
3933434 - HIGH TEMPERATURE CHEMICAL REACTOR						
MERESZ	OTTO		8 WALLINGFORD RD.	DON MILLS, BOTH OF O		CA
4098648 - ROTARY SEPARATING AND EXTRACTING DEVICES						
MORRELL	JACQUE	C.	4501 CONNECTICUT AVE., NW. APA	WASHINGTON	DC	20008
3954597 - PROCESS FOR THE PRODUCTION OF DISTILLATE FUELS FROM OIL SHALES AND BY-PRODUCTS THEREFROM						
MORRELL	JACQUE	C.	4501 CONNECTICUT AVE., NW., AP	WASHINGTON	DC	20008
4105536 - PROCESSES INCLUDING THE PRODUCTION OF NON-CONGEALING SHALE OIL FROM OIL SHALES						
MYERS	ELMAN	B.	550 BERDAN AVE.	WAYNE	NJ	
3953317 - COMPOSITION AND METHOD FOR SEPARATING BITUMINOUS CONSTITUENTS FROM BITUMINUM-BEARING SANDS						
MYERS	MARIAN	M.	550 BERDAN AVE.	WAYNE	NJ	07470
3953317 - COMPOSITION AND METHOD FOR SEPARATING BITUMINOUS CONSTITUENTS FROM BITUMINUM-BEARING SANDS						
O'CONNOR	CHADWELL		2024 GALAXY DRIVE	NEWPORT BEACH	CA	92660
4066024 - ROTATING FLUIDIZED BED COMBUSTOR						
OVSYANNIKOV	ANATOLY	FILIPPOVI	ULITSA KIROVA, 12, KV. 117	NOVOKUZNETSK KEMEROV		SU
3990949 - DEVICE FOR RETURNING REMAINDERS FROM THE PLATFORM TO THE INTERIOR OF A COKE OVEN						
PAINTER	OLIVER	K.	101 N. CHURCH ST.	MOUNT PLEASANT	PA	15666
3912597 - SMOKELESS NON-RECOVERY TYPE COKE OVEN						

UNASSIGNEO PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
PRULL	PHILLIP	EARL	2100 LEWELLING BLVO. NO. 10	SAN LEANORO	CA	94579
4028222 - METHOO FOR EXTRACTING OIL FROM OIL SHALE						
PUTMAN	MAURICE	W.	8346 E. VALLEY VISTA	SCOTTSOALE	AZ	85253
4075083 - METHOD FOR DESTRUCTIVE DISTILLATION OF HYOROCARBONACEOUS MATERIALS						
REED	THOMAS	G. JR.	818 HEATHER COURT	HOUSTON	TX	77024
3939057 - PROCESS FOR TREATING OIL SHALE						
4058205 - APPARATUS FOR TREATING OIL SHALE						
REEVES	ADAM	A.	P.O. BOX 781	ANVIL POINTS, RIFLE	CO	81650
4042485 - COMBUSTON METHOD OF OIL SHALE RETORTING						
REIS	THOMAS		4 VILLA DE MADRIO	92 NEUILLY		FR
3954674 - PROCESS ANO DEVICE FOR CALCINATING OESULFURIZATION OF GREEN COKES WITH HIGH SULFUR CONTENT BY THE PREPARATION OF HIGH QUALITY AND DENSITY DESULFURIZED COKES						
ROSENBLOOM	WILLIAM	J.	8 PIONEER RD.	WESTPORT	CT	06880
3875046 - RECOVERY OF OIL FROM TAR SANO BY AN IMPROVEO EXTRACTION PROCESS						
SANGA	YASUHIRO		19-26, 5-CHOME, SHAKUJIICHO	NERIMAKU, TOKYO		JA
3875077 - METHOO OF ANO APPARATUS FOR PROOUCING ACTIVATEO CHARCOAL FROM WASTE TIRES						
SCHROEDER	WILBURN	C.	7316 RADCLIFFE OR.	COLLEGE PARK	MO	20740
3909212 - REMOVAL OF SULFUR FROM CARBONACEOUS FUELS						
SCHROEDER	WILBURN	C.	7316 RAOCLIFFE DRIVE	COLLEGE PARK	MO	20740
3926775 - HYDROGENATION OF COAL						
3944480 - PRODUCTION OF OIL ANO HIGH BTU GAS FROM COAL						
3954596 - PROOUCTION OF LOW SULFUR HEAVY OIL FROM COAL						
3960701 - HYDROGENATION OF COAL TO PROOUCE COKE, PITCH ANO ELECTRODE CARBON						
4013426 - REMOVAL OF SULFUR FROM CARBONACEOUS FUEL						
SINGH	ALAMJIT	D.	P.O. BOX 1679	CHICAGO	IL	60690
3909364 - WASTE OISPOSAL METHOD ANO APPARATUS						
4039392 - PROCESS AND APPARATUS FOR PROOUCING CHAR ANO CO-PROOUCTS FROM COAL ANO THE LIKE						
SMITH	DAVID	E.	RT. 2	ROLLA	MO	65401
3901766 - METHOO AND APPARATUS FOR PROOUCING CHARCOAL						
SPECKEN	GERALD	A.	10719 HAROISTY ORIVE	EDMONTON, ALBERTA		CA
4069152 - CLARIFICATION OF CLAY CONTAINING WATER						
SQUIRES	ARTHUR	M.	245 W. 104 ST.	NEW YORK	NY	10025
4032305 - TREATING CARBONACEOUS MATTER WITH HOT STEAM						
STORRS	KINORED	L.	881 SECONO AVE.	SALT LAKE CITY	UT	84103
3985637 - PROCESS FOR SEPARATING ANO RECOVERING LIQUIO PROOUCTS FROM SOLIO ANO LIQUIO SUBSTANCES						
STOUT	VINCENT	H.	1003 SIERRA ORIVE	RIVERTON	WY	82501
3977960 - HYOROCARBON RECOVERY SYSTEM						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
SWANSON	ROLLAN		220 CALIFORNIA AVE.	SANTA MONICA	CA	90403
4018572 - DESULFURIZATION OF FOSSIL FUELS						
SZE	MORGAN	C.	18 SKYTOP TER.	UPPER MONTCLAIR	NJ	07043
3878051 - DESULFURIZING COKE WITH PHOSGENE OR A MIXTURE OF CARBON MONOXIDE AND CHLORINE						
VESTAL	GEORGE	W.	RT. 4, BOX 238	DENTON	TX	76201
3870611 - PROCESSING OF COAL TO PRODUCE LIQUID AND VAPOROUS HYDROCARBONS						
WHITTEN	CHARLES	M.	RT. 7, GOLF COURSE LN.	COLUMBIA	TN	38401
3870652 - PRODUCTION OF ACTIVATED CHAR USING A MOVING GRATE STOKER FURNACE						
WITHORN	BENJAMIN		601 FORBES ST.	FALMOUTH	VA	22401
3948617 - METHOD OF REDUCING SULPHUR DIOXIDE EMISSIONS FROM COMBUSTIBLE MATERIALS						
YOUNG	SERENUS	H.	APT. S-3, 1716 TERRELL MILL RD	MARIETTA	GA	30060
4108759 - PROCESS AND APPARATUS FOR CONVERTING COAL INTO OIL AND OTHER COAL DERIVATIVES						
ZAVITSANOS	PETER	D.	3018 OAK DRIVE	NORRISTOWN	PA	19403
4076607 - PROCESS FOR COAL DESULFURIZATION						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3432397 - METHOD OF RETORTING SOLIDS
3433713 - GRAVITY-FLOW CALCINER AND PROCESS FOR CALCINING CARBONACEOUS SOLIDS
3436314 - TECHNIQUE FOR CONVERTING BAGASSE AND OTHER MOIST PLANT SUBSTANCES INTO CHARCOAL
3437561 - AGGLOMERATING COAL HYDROCARBONIZATION PROCESS
3437562 - PROCESS FOR PRODUCING COMBINED COAL CHAR AND OIL COKE AND COPRODUCTS THEREWITH
3441394 - MAKING STEAM FOR GASIFYING COAL
3444047 - METHOD FOR MAKING METALLURGICAL COKE
3448794 - DEVICE FOR EXTRACTING FROM OIL BEARING SHALE
3449213 - PYROLYSIS OF COAL WITH MICROWAVE ENERGY
3462346 - SMOKELESS COKE OVENS
3472553 - METHOD OF AND APPARATUS FOR EXTRACTING BITUMEN
3475279 - RECOVERY PROCESS AND APPARATUS
3475317 - METHOD AND APPARATUS FOR OF SOLID HYDROCARBONACEOUS MATERIALS INCLUDING REACTIONS BETWEEN GASES AND UNSIZED SO LIDS AND THE PHYSICAL SEPARATION THEREOF
3481834 - PROCESS AND APPARATUS FOR DESULFURIZING FUELS
3494833 - COKE OVEN BATTERY INCLUDING HIGH AND LOW RICH GAS BURNERS
3503868 - METHOD OF EXTRACTING AND CONVERTING PETROLEUM FROM OIL SHALE
3506542 - METHOD FOR CONTROLLING THE READINESS OF THE COKE MASS IN THE CHAMBER OF A HORIZONTAL COKE OVEN
3509027 - OIL SHALE RETORTING APPARATUS HAVING FRUSTO- CONICAL PASSAGES
3519540 - CARBONIZING OVEN HAVING PARALLEL HORIZONTAL FLUES AND U-SHAPED AIR DUCTS
3522168 - CHELATING AGENTS IN BITUMINOUS SAND WATER PROCESS
3523911 - METHOD OF SEPARATING COMPONENTS OF CELLULOSIC MATERIAL
3525673 - CLOSED, CONTROLLED SYSTEM FOR CARBONIZING ORGANIC REFUSE
3526586 - RETORTING OF OIL SHALE
3553100 - UPGRADING OF OIL RECOVERED FROM BITUMINOUS SANDS
3560347 - APPARATUS FOR CARBONIZING CARBONACEOUS MATERIALS USING MICROWAVE ENERGY
3562179 - APPARATUS FOR DEWATERING A BITUMINOUS EMULSION

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3565785 - TEMPERATURE CONTROL IN RECOVERY OF BITUMEN FROM BITUMINOUS SANO
3567621 - RECOVERY OF BITUMEN FROM BITUMINOUS SANO
3567622 - OIL RECOVERY PROCESS
3573195 - AOOITION OF LIGHT HYOROCARBON GAS TO TAR SANO
3573196 - USE OF LIGHT HYOROCARBONS IN TAR SANO PROCESSING
3574086 - RESTORATION OF LIGHT HYOROCARBON GASES TO TAR SANO
3577338 - PROCESS FOR RECOVERY OF OIL FROM OIL SHALE SIMULTANEOUSLY PROOUCING HYOROGEN
3597327 - PROCESS FOR PYROLYZING A SOLIO OR LIQUIO HYOROCARBONACEOUS FUEL IN A FLUIOIZEO BEO
3605975 - APPARATUS FOR PROCESSING BITUMINOUS SANOS
3607721 - PROCESS FOR TREATING A BITUMINOUS FROTH
3615599 - METHOO OR ANO APPARATUS FOR PROCESSING GARLIC
3625861 - REGENERATION OF ZINC HALIOE CATALYST USEO IN THE HYOROCRACKING OF POLYNUCLEAR HYOROCARBONS
3632479 - TREATMENT OF COAL TO PREVENT AGGLOMERATION
3644192 - UPFLOW THREE-PHASE FLUIOIZEO BEO COAL LIQUEFACTION REACTOR SYSTEM
3645854 - METHOO IN BY-PROOUCT COKE OVEN OPERATION ANO APPARATUS FOR SAME
3649292 - RECOVERY OF PROOUCTS FROM PLANTAIN WASTES IN GHANA
3649498 - OETECTION IN CHROMATOGRAPHY
3652447 - PROCESS FOR EXTRACTING OIL FROM OIL SHALE
3653515 - TIE RACK
3661719 - NON-POLLUTING BY-PRODUCT COAL CARBONIZATION PLANT
3663186 - METHOO OF PROOUCING METALLURGICAL COKE
3679080 - PROCESS FOR LAUNCHING ANO RECOVERY OF TOP-OF-VEHICLE TRANSPORTEO WATERCRAFT
3689365 - REGENERATIVE COKE FURNACE ANO METHOO OF HEATING IT
3691019 - RETORTING APPARATUS WITH HOOO-SHAPEO UNITARY COOLANT JACKET OISPOSEO OVER SCREW CONVEYOR
3697412 - METHOO OF PROCESSING OIL SHALE
3706662 - NON-POLLUTING WASTE REOUCER ANO METHOO
3717570 - SIMULTANEOUS HYOROFINING OF COKER GAS OIL, VACUUM GAS OILS ANO VIRGIN KEROSENE
3733183 - LOW SULPHUR FUEL SYSTEM UTILIZING COAL CHAR, ANO CO-PROOUCTS THEREOF
3733271 - WASTE OISPOSAL APPARATUS ANO METHOO
3734833 - LOW SULPHUR FUEL SYSTEM
3761359 - METHOO ANO APPARATUS FOR HEAT-TREATING MATERIALS
3770419 - PYROLYSIS PROCESS SYSTEM FOR RECYCLING OF REFUSE
3779722 - PROCESS FOR OESULFURIZING FUEL
3784034 - COKE OVEN PUSHING ANO CHARGING MACHINE ANO METHOO
3807564 - COMPACT SEWAGE TREATMENT UNIT
3823073 - CALCINING COKE IN VERTICAL KILN
3823084 - HYOROGENATION OF COAL
3830903 - CARBONIZATION OF EXPANOEO NATURAL GRAINS
3835064 - PROCESS FOR MANUFACTURING AN ACTIVATEO CARBON
3836435 - METHOO OF HEAT TREATMENT OF COAL
3847752 - AIR OIFFUSION IN ROTARY HEARTH CALCINER
3853498 - PROOUCTION OF HIGH ENERGY FUEL GAS FROM MUNICIPAL WATES
3855070 - HYOROPYROLYSIS OF HYOROCARBONACEOUS FUEL AT SHORT REACTION TIMES
3856474 - BITUMEN EXTRACTION APPARATUS INCLUOING ENOLESS PERFORATE CONVEYOR ANO PLURAL SOLVENT-SPRAY MEANS
3857758 - METHOO ANO APPARATUS FOR EMISSION FREE OPERATION OF BY-PROOUCT COKE OVENS
3951749 - TAR SANO PROCESSING APPARATUS
4111800 - PROCESS FOR TREATING MUNICIPAL SOLIO WASTE ANO RAW SEWAGE SLUOGE
3072187 3073751 3074877 3075889 3075912 3075913 3076694 3076751 3077439 3081027 3084118 3085582

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3085947	3086362	3086923	3090731	3092471	3093571	3094467	3098799	3101303	3106521	3107985	3108059
3108930	3109781	3109803	3110605	3111395	3112181	3112255	3114694	3116231	3117064	3117072	3117918
3117921	3117922	3118741	3118746	3120474	3122493	3123540	3123546	3127243	3129164	3130132	3130133
3130142	3130146	3131141	3133010	3133869	3135618	3136705	3138440	3139397	3140240	3140241	3140242
3140985	3140987	3141834	3143489	3146175	3146183	3150619	3151040	3151041	3151054	3151057	3152063
3152979	3153625	3158561	3158566	3159562	3161581	3162583	3162594	3163496	3164541	3166483	3167487
3167494	3171720	3171795	3172823	3173769	3173852	3177128	3179391	3183180	3184293	3184397	3184401
3185635	3186923	3188179	3189536	3190814	3192127	3192134	3193471	3194753	3198714	3200049	3201329
3201330	3203888	3208930	3211643	3211673	3214346	3219108	3222221	3222261	3224954	3226316	3227627
3228869	3231486	3232845	3232861	3236745	3238054	3240566	3244615	3247079	3247092	3248303	3251751
3252773	3252774	3252871	3252886	3254959	3254976	3258409	3260513	3261775	3265608	3267019	3267998
3271268	3271293	3272720	3272721	3273967	3275546	3275547	3276203	3278412	3281349	3282826	3284317
3284336	3291717	3296117	3297550	3297562	3298928	3309437	3314767	3316155	3318798	3320152	3321393
3325395	3330757	3331754	3331765	3332853	3336104	3337417	3338814	3341447	3346481	3349022	3350280
3355363	3355376	3357896	3361644	3362887	3365384	3368012	3369871	3371049	3373085	3373086	3374052
3374151	3375175	3375188	3376202	3377266	3379622	3379638	3384467	3384557	3384569	3387941	3391076
3392105	3392833	3393978	3396099	3398058	3399765	3401089	3401110	3403989	3404960	3407003	3409509
3414480	3416598	3419474									

II. A. IN VITRO CONVERSION: OBTAINING LIQUID HYDROCARBONS
1. PROCESSES

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,132,627	Arnold M. Leas, 309 E. Van Buren, Columbia City, ID 46725: Integrated Coal Conversion Process
4,132,628	Continental Oil Company: Method For Recovering Hydrocarbons From Molten Metal Halides
4,133,381	Occidental Oil Shale, Inc.: Contacting Treated Oil Shale With Carbon Dioxide To Inhibit Leaching
4,133,646	Electric Power Research Institute, Inc.: Phenolic Recycle Solvent In Two-Stage Coal Liquefaction Process
4,133,718	Dravo Corporation: Method For Agglomerating Finely Divided Agglomerative Materials In A Rotary Drum Assembly
4,133,719	Didier Engineering GmbH, Germany: Process and Apparatus For Charging Inclined Chamber Coke Oven
4,133,739	Chevron Research Company: Retorting Process
4,133,740	Gulf Research & Development Company: Process For Increasing The Fuel Field Of Coal Liquefaction Products By Extraction Of Asphaltenes, Resins And Aromatic Compounds From Said Coal Liquefaction Products
4,133,741	The Superior Oil Company: Method For Recovery Of Hydrocarbon Fractions From Hydrocarbon-bearing Materials
4,133,742	William H. Hill, 38 Suzanne Ave., St. Paul, MN 55110: Separation Of Hydrocarbons From Oil Shales And Tar Sands
4,133,867	Occidental Petroleum Corporation: Counter-Current Process With A Hydrodesulfurization of Solid Carbonaceous Materials
4,134,737	Aluminum Company of America: Process For Producing High-Purity Coal
4,134,794	Firma Carl Still & Rheinische Braunkohlenwerke Aktiengesellschaft, Germany: Method For Producing Non-Abrasive Coke Forms From Brown-coal Briquets
4,134,821	Continental Oil Company: Maintenance Of Solvent Balance In Coal Liquefaction Process

4,134,822 University of Utah: Process For Minimizing Vaporizable Catalyst Requirements For Coal Hydrogenation-Liquefaction

4,134,826 Continental Oil Company: Method For Producing Hydrocarbon Fuels From Heavy Polynuclear Hydrocarbons By Use Of Molten Metal Halide Catalyst

4,135,579 Raytheon Company: In Situ Processing Of Organic Ore Bodies

4,135,885 Wormser Engineering, Inc.: Burning And Desulfurizing Coal

4,135,889 University of Utah: Single Stage Coal Gasification Reactor

4,135,948 Krupp-Koppers GmbH, Germany: Method And Apparatus For Scraping The Bottom Wall Of A Coke Oven Chamber

4,135,968 Weyerhaeuser Company: Spent Liquor Treatment

4,135,982 Occidental Petroleum Corporation: Method For Preventing Plugging In The Pyrolysis Of Agglomerative Coals

4,135,983 Kureha Kagaku Kogyo Kabushiki Kaisha and Sumikin Coke Co., Ltd.: Method For Improving Coking Property Of Coal For Use In Production of Cokes

4,135,987 Krupp-Koppers GmbH, Germany: Apparatus For Cleaning The Bottom Surface Of A Coke Oven Door Plug

4,136,013 The Dow Chemical Company: Emulsion Catalyst For Hydrogenation Processes

4,136,056 Continental Oil Company: Regeneration Of Zinc Chloride Hydrocracking Catalyst

4,137,050 Standard Oil Company: Coal Desulfurization

4,138,221 Continental Oil Company: Manufacture Of Pellets From Coal Conversion Products

4,138,222 Continental Oil Company: Pelletization Of Coal Conversion Products

4,138,223 Continental Oil Company: Manufacture Of Pellets From Coal Liquefaction Products

4,138,224 Continental Oil Company: Production Of Fixed Bed Gasifier Feedstock And Fuels From Coal

4,138,467 The Canadian Govt.: Method For Concentrating Heavy Minerals In The Solids Tailings From Hot Water Extraction Of Tar Sands

4,139,416 Centro Sperimentale Metallurgio SpA: Carbonaceous Material With High Characteristics Of Surface Area And Activity And Process For Producing The Same

4,139,419 Hutni Projekt Praha, Projekeni a Inzenyrska Organizace: Arrangement For Dosing A Coal Charge To A Coking Battery

4,139,451 Nalco Chemical Company: Method For Dewatering Coke Tar-Water Mixtures

4,140,181 Occidental Oil Shale, Inc.: Two-stage Removal Of Sulfur Dioxide From Process Gas Using Treated Oil Shale

4,140,583 Pioneer Corporation: Processing Of Lignite For Petrochemicals

4,140,623 Continental Oil Company: Inhibition Of Coke Puffing

4,141,793 Nissho-Iwai Co., Ltd.: Process For Preparation Of Coke And Carbonizer Therefor

4,141,794 Occidental Petroleum Corporation: Grid-Wall Pyrolysis Reactor

4,141,795 Nippon Kokan Kabushiki Kaisha: Dry Type Method For Quenching Coke

4,141,796 Bethlehem Steel Corporation: Coke Oven Emission Control Method And Apparatus

4,141,797 Dr. C. Otto & Company GmbH, Germany: Method Of Operating A Battery Of Coke Ovens

4,141,818 Jung B. An, No. 3-1 JungAng Dong, Busan, Korea: Method Of Collecting Oil From Crude Oil Residue

4,142,941 Firma Carl Still Recklinghausen, Germany: Method For Producing Blast Furnace Coke

4,142,942 Albert Calderon, 1065 Melrose Dr., Bowling Green, OH 43402: Method And Apparatus For Quenching Coke

4,144,033 Kobe Steel, Ltd.: Process For Manufacturing Metallurgical Carbonaceous Materials From Coals

4,145,189 Energy Conversion Systems Limited: Process For Preparing A Clear-burning, Low Sulphur Liquid Fuel From Coal

4,145,256 Georgia Tech Research Institute: Method And Apparatus For Producing A Carbonaceous Residue Product

4,145,274 Occidental Petroleum Corporation: Pyrolysis With Staged Recovery

4,146,359 Occidental Petroleum Corporation: Method For Reacting Nongaseous Material With A Gaseous Reactant

4,146,367 California Institute Of Technology: Coal Desulfurization

4,146,370 Shell Internationale Research Maatshappij B.V.: Process And Apparatus For The Partial Combustion Of Coal Powder

4,146,434 Standard Oil Company: Process For The Desulfurization Of Petroleum Coke

4,146,435 Mitsubishi Chemical Industries, Ltd., Ayogo & Kansai Netsukagaku Kabushiki Kaisha: Dust Collecting System For Coke Oven

4,146,459 Continental Oil Company: Treatment Of Coal Liquefaction Effluent

4,146,460 Delbert D. Thomas, 1522 Cameo Dr., Redlands, CA 92373: Oil Shale Retort Apparatus And Process

4,147,593 Occidental Petroleum Corporation: Flash Pyrolysis Of Organic Solid Waste Employing Ash Recycle

4,147,594 Koppers Company, Inc.: One-spot Cylindrical Coke Quenching Car And Quenching Method

4,147,615 Arnold M. Leas, 309 E. Van Buren, Columbia City, ID 46725: Hot Sand-Coal-Cracking To Hydrodistillate Fuels

4,148,614 Chalmer G. Kirkbride, 13 Elk Forest, R.D. No. 2, Elkton, MD 21921: Process For Removing Sulfur From Coal

4,148,692 Bethlehem Steel Corporation: Process For Producing Low Reactivity Calcined Coke Agglomerates

4,148,709 The Lummus Company: Hydroliquefaction Of Sub-Bituminous And Lignitic Coals To Heavy Pitch

4,148,710 Occidental Oil Shale, Inc.: Fluidized Bed Process For Retorting Oil Shale

4,148,716 Gulf Research & Development Company: Process For Separating Tar And Solids From Coal Liquefaction Products Using A Halogenated Aliphatic Solvent

4,148,752 Bayer Aktiengesellschaft, Leverkusen: Production Of Activated Carbon In A Reactor Having A Lower Static Layer And An Upper Fluidized Layer

4,149,597 Texaco Exploration Canada Ltd.: Method For Generating Steam

4,149,939 Salem Corporation: Method And Apparatus For Feeding An Oxidant Within A Furnace Enclosure

4,149,959 Exxon Research & Engineering Co.: Coal Liquefaction Process

4,150,093 The Canadian Govt.: Method For Concentrating Heavy Minerals In The Solids Tailings From Hot Water Extraction Of Tar Sands

4,150,548 Kemp Reduction Corporation: Pollutant Removal From Pyrolytic Gases By Centrifuge And Molecular Sieves

4,150,958 Richard Jablin, P.O. Box 514, Winchester, VA 22601: Treatment Of Waste Liquor

4,151,044 Occidental Research Corporation: Process For The Pyrolysis Of Carbonaceous Materials In A Double Helix Cyclone

4,151,047 S.A. des Anciens Etablissements Paul Wurth, Luxembourg: Feed Installation For Apparatus For Extracting Hydrocarbons From Bituminous Schists

4,151,066 Mobil Oil Corporation: Coal Liquefaction Process

4,151,073 Hydrocarbon Research, Inc.: Process For Phase Separation

4,152,120 General Electric Company: Coal Desulfurization Using Alkali Metal or Alkaline Earth Compounds And Electromagnetic Irradiation

4,152,243 S.A. des Anciens Etablissements Paul Wurth, Luxembourg: Treatment Of Bituminous Schists

4,152,244 Ludwig Raichle, 12 Weinbietstrasse, 6703 Limburgerhof, & Walter Kroenig, 7 Mathildenstrasse, 6200 Wiesbaden, both of Germany: Manufacture of Hydrocarbon Oils By Hydrocracking Of Coal

4,152,245 Atlantic Richfield Company: Separation Of Rock Solids From Heat Carriers In An Oil Shale Retorting Process

4,153,420 Ra Shipping Ltd.: Process For Wet Carbonizing Of Peat

4,153,514 Occidental Petroleum Corporation: Pyrolysis Process For Solid Wastes

4,153,533 Chalmer G. Kirkbride, 13 Elk Forest, R.D. No. 2, Elkton, MD 21921: Shale Conversion Process

4,154,584 Dr. C. Otto & Comp. GmbH, Germany: Method For Cooling Gases Containing Naphthalene, Tar & Solids

4,155,715 Occidental Petroleum Corporation: Process For Reducing The Organic Sulfur Content Of Char

4,155,716 Atlantic Richfield Company: Process For Removing Sulfur From Coal

4,155,717 Atlantic Richfield Company: Process For Removing Sulfur From Coal Employing Aqueous Solutions Of Sulfites And Bisulfites

4,155,832 The U.S. of America as rep. by U.S. Dept. of Energy: Hydrogenation Process For Solid Carbonaceous Materials

4,156,595 Peabody Coal Company: Formcoke Process And Apparatus

4,157,245 Chevron Research Company: Countercurrent Plug-Like Flow Of Two Solids

4,157,246 Exxon Research & Engineering Co.: Hydrothermal Alkali Metal Catalyst Recovery Process

4,157,291 Gulf Research & Development Company: Process For Extending Life Of Coal Liquefaction Catalyst

4,157,305 Chemap AG: Method Of Filtering Molten Coal

4,157,940 Dr. C. Otto & Company GmbH: Method For Operating A Battery Of Horizontal Coke Ovens

4,158,548 Atlantic Richfield Company: Process For Removing Sulfur From Coal

4,158,610 Bethlehem Steel Corporation: Method And Apparatus For Determining And Controlling Amount of Carbon Deposited On A Surface By A Gas

4,158,620 Atlantic Richfield Company: Retorting Oil Shale With Iron Oxide Impregnated Porous Pellets

4,158,637 Westinghouse Electric Corporation: Conversion Of Coal Into Hydrocarbons

4,158,638 Gulf Research & Development Company: Conversion Of Coal Into Hydrocarbons

4,158,948 Texaco, Inc.: Conversion of Solid Fuels Into Fluid Fuels

4,159,195 Exxon Research & Engineering Co.: Hydrothermal Alkali Metal Recovery Process

4,159,236 Gulf Oil Corporation: Method For Combining Coal Liquefaction And Gasification Processes

4,159,237 Gulf Oil Corporation: Coal Liquefaction Process Employing Fuel From A Combined Gasifier

4,159,238 Gulf Oil Corporation: Integrated Coal Liquefaction - Gasification Process

4,159,240 John M. Malek, P.O. Box 71 Lomita, A 90717: Separating Liquid And Solid Products Of Liquefaction Of Coal Or Like Carbonaceous Materials

4,159,897 Fluid Coal Corporation: Producing Fluid Fuel From Coal

4,159,905 Bergwerksverband GmbH and Rheinstahl Huttenwerke AG: Method Of Manufacturing Green Hot Briquettes From Fine Coal For Use In Shaft Furnaces

4,160,479 Reginald D. Richardson, 53 Valecrest Dr., & Robert H. Shannon 59 Valecrest Dr., both of Islington, Ontario, Canada M9A 4P5: Heavy Oil Recovery Process

4,160,719 Phillips Petroleum Company: Iron-Containing Refractory Balls For Retorting Oil Shale

4,160,720 University of Utah: Process And Apparatus To Produce Synthetic Crude Oil From Tar Sands

4,160,814 Great Lakes Carbon Corporation: Thermal Desulfurization And Calcination Of Petroleum Coke

4,161,440 Exxon Research & Engineering Co.: Liquefaction Of Calcium-Containing Subbituminous Coals And Coals Of Lower Rank

4,161,441 Jacque C. Morrell, 4501 Conn. Ave., NW Wash., D.C. 20008: Process For The Production Of Distillate Fuels From Oil Shales And By-product Therefrom

4,161,442 Mobil Oil Corporation: Processing Of Tar Sands

4,162,898 The Standard Oil Company: Process For Removing Sulfur From Coal

4,162,943 Occidental Petroleum Corporation: Slot Pyrolysis Reactor And Method Of Pyrolysis

4,162,944 United States Steel Corporation: Spotting Method And Apparatus For Coke Oven Batteries

4,162,956 Kerr-McGee Corporation: Coal Deashing Process Having Improved Solvent Recovery Techniques

4,162,957 Kerr-McGee Corporation: Method Of Feeding Solids To A Process Unit

4,162,958 Kerr-McGee Corporation: Process For The Discharge Of Ash Concentrate From A Coal Deashing System

4,162,959 Occidental Petroleum Corporation: Production Of Hydrogenated Hydrocarbons

4,162,960 Union Oil Company of California: Shale Retorting Process And Apparatus

4,162,963 Continental Oil Company: Method For Producing Hydrocarbon Fuels And Fuel Gas From Heavy Polynuclear Hydrocarbons By The Use Of Molten Metal Halide Catalysts

4,162,964 Kerr-McGee Corporation: Method Of Handling Ash-Rich Material In A Coal Deashing Process

4,163,693 Occidental Petroleum Corporation: Fluidizing A Mixture Of Particulate Coal And Char

4,164,397 Herbert H. Hunt, 3608 Vine Maple, Egene, Oreg. 97405, & Harold S. Worcester, 91040 Hill Rd., Springfield, Oreg., 97417: Fuel Gas Production

4,164,466 Kerr-McGee Corporation: Method Of Improving Yield In A Coal Liquefaction Product Deashing Process

4,165,216 Enerco, Inc.: Continuous Drying And/Or Heating Apparatus

4,165,220 Centro Sperimentale Metallurgio SpA.: Process For Producing Hardened Semicoke Briquettes

4,165,260 Inland Steel Company: Pipeline Charging Of Coal Into Coke Oven

4,166,022 Gulf Research & Development Company: Recovery Of Oil From Oil Shale

4,166,023 Sunoco Energy Development Company: Pour Point Depressant For Shale Oil

II. A. IN VITRO CONVERSION: OBTAINING LIQUID HYDROCARBONS

2. APPARATUS

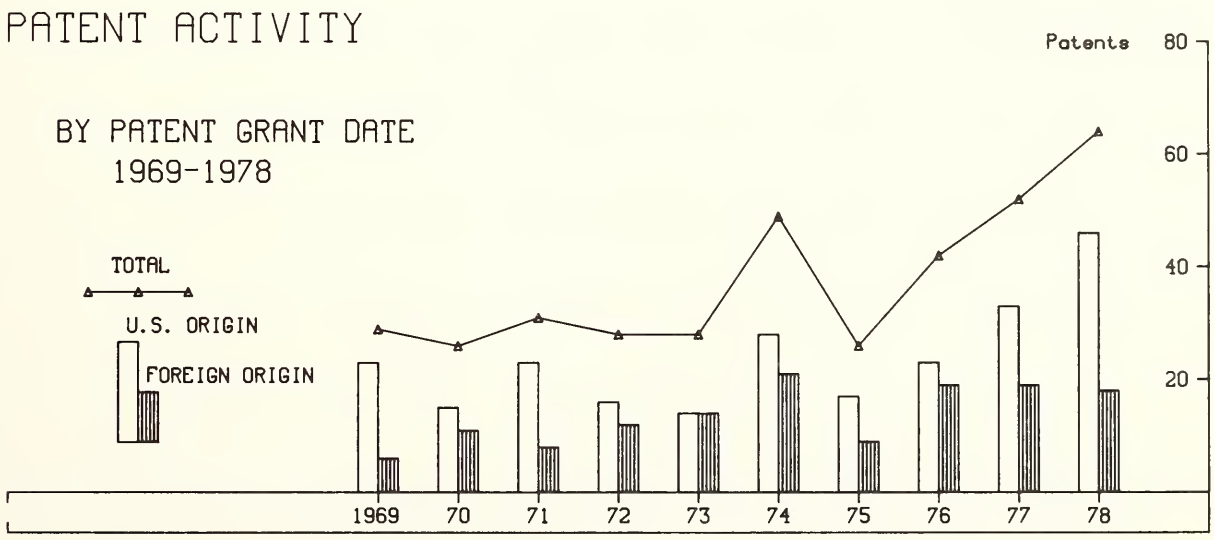
This profile includes thermolytic distillation apparatus for the conversion of solid carbonaceous material to liquid hydrocarbons.

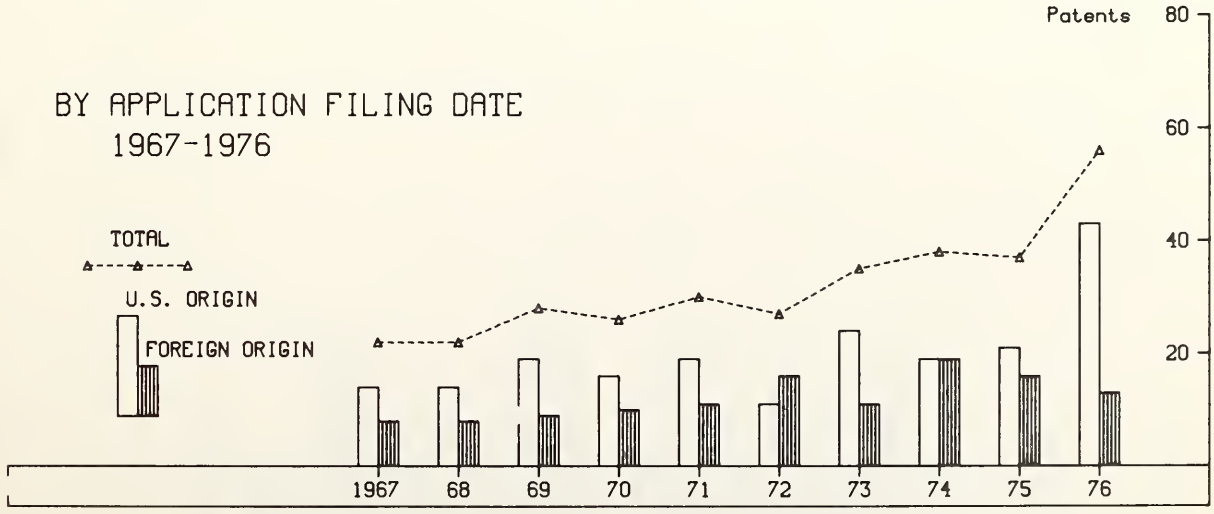
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 202, Subclasses 81-151, and 207-230

ACTIVITY INDICES (1976-1978)

GROWTH	42.1%
FOREIGN SHARE	35.4%
CORPORATE OWNED	79.8%
GOVERNMENT OWNED	0.0%
U.S. OWNED OF FOREIGN	1.8%





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	23	28	12	22	27	29	26	31	28	28	49	26	42	52	64	487
U.S. ORIGIN	21	23	8	18	23	23	15	23	16	14	28	17	23	33	46	331
FOREIGN ORIGIN	2	5	4	4	4	6	11	8	12	14	21	9	19	19	18	156
GERMANY		3	4	1	2	6	4	5	10	13	19	5	9	11	11	103
JAPAN				1	1		3		1			2	4	3	4	19
U.S.S.R.							3	1			1	1	1	1		8
UNITED KINGDOM				2	1			1					1		1	6
NETHERLANDS		1										1	1	1		4
CANADA													1	1	1	3
FRANCE	1										1			1		3
SWEDEN	1	1														2
PORTUGAL															1	1
CHINA(TAIWAN)														1		1
AUSTRALIA													1			1
ISRAEL								1								1
ITALY										1						1
BELGIUM							1									1
CZECHOSLOVAKIA									1							1
POLAND													1			1
U.S. ORIGIN	21	23	8	18	23	23	15	23	16	14	28	17	23	33	46	331
U.S. CORP. OWNED	18	20	7	10	16	16	11	19	12	13	22	13	14	24	37	252
U.S. GOVT. OWNED					1	1			1							3
U.S. INDIV. OWNED	3	3	1	8	6	6	4	4	3	1	6	4	9	8	8	74
FOREIGN OWNED														1	1	2
FOREIGN ORIGIN	2	5	4	4	4	6	11	8	12	14	21	9	19	19	18	156
U.S. OWNED		1	2	1	1		1	1	1		1				1	10
FOREIGN OWNED	2	4	2	3	3	6	10	7	11	14	20	9	19	19	17	146
FOREIGN CORP.	2	3	1	3	1	1	6	6	9	12	18	5	18	14	16	115
FOREIGN GOVT.												1				1
FOREIGN INDIV.		1	1		2	5	4	1	2	2	2	3	1	5	1	30

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	36	15	24	22	22	28	26	30	27	35	38	37	56	28		424
U.S. ORIGIN	30	12	18	14	14	19	16	19	11	24	19	21	43	19		279
FOREIGN ORIGIN	6	3	6	8	8	9	10	11	16	11	19	16	13	9		145
GERMANY	3	1	4	4	4	8	7	11	14	8	10	8	10	4		96
JAPAN	1	1	1		2		1			1	5	3	2	2		19
U.S.S.R.				4			1			1		2				8
UNITED KINGDOM	2		1		1						1			1		6
NETHERLANDS									1	1	1					3
CANADA											1	1		1		3
FRANCE									1			1				2
SWEDEN																
PORTUGAL														1		1
CHINA(TAIWAN)													1			1
AUSTRALIA											1					1
ISRAEL						1										1
ITALY							1									1
BELGIUM					1											1
CZECHOSLOVAKIA		1														1
POLAND												1				1
U.S. ORIGIN	30	12	18	14	14	19	16	19	11	24	19	21	43	19		279
U.S. CORP. OWNED	19	7	13	11	12	13	13	17	8	21	10	14	34	15		207
U.S. GOVT. OWNED		1	1				1									3
U.S. INDIV. OWNED	11	4	4	3	2	6	2	2	3	3	9	6	9	3		67
FOREIGN OWNED												1		1		2
FOREIGN ORIGIN	6	3	6	8	8	9	10	11	16	11	19	16	13	9		145
U.S. OWNED	2				1	2			1					1		7
FOREIGN OWNED	4	3	6	8	7	7	10	11	15	11	19	16	13	8		138
FOREIGN CORP.	3	2	1	3	7	6	8	9	14	8	18	12	10	8		109
FOREIGN GOVT.											1					1
FOREIGN INDIV.	1	1	5	5		1	2	2	1	3		4	3			28

II. A. IN VITRO CONVERSION - OBTAINING LIQUID HYDROCARBONS
2. APPARATUS

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

KOPPERS COMPANY INC.	39
DR. C. OTTO COMP. G.M.B.H.	27
FIRMA CARL STILL	15*
HEINRICH KOPPERS GMBH	11*
OCCIDENTAL PETROLEUM CORPORATION	11
MARATHON OIL COMPANY	9
SALEM CORPORATION	7
AMERICAN WAAGNER-BIRO COMPANY, INC.	6
BERGWERKSVERBAND GMBH	5
UNITED STATES STEEL CORPORATION	5
SUN OIL COMPANY OF PENNSYLVANIA	4
ALLIS-CHALMERS CORPORATION	4
GREAT LAKES CARBON CORPORATION	4
NICHOLS ENGINEERING + RESEARCH CORPORATION	4
PEABODY COAL COMPANY	4
NIPPON KOKAN KABUSHIKI KAISHA	4
DRAVO CORPORATION	3
BETHLEHEM STEEL CORPORATION	3
CONTINENTAL OIL COMPANY	3
KOPPELMAN, EDWARD	3
INTERLAKE INC.	3
MOBIL OIL CORPORATION	3
PENNSYLVANIA COKE TECHNOLOGY, INC.	3
NIPPON STEEL CORPORATION	3
PHILLIPS PETROLEUM COMPANY	3
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	3
AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)	3
WILPUTTE CORPORATION	3
TAKEDA CHEMICAL INDUSTRIES, LTD.	3
BARNEBEY-CHENEY CO.	2
NATIONAL STEEL CORPORATION	2
MONSANTO COMPANY	2
CHEVRON RESEARCH COMPANY	2
INGERSOLL-RAND RESEARCH INC.	2
OIL SHALE CORPORATION	2
EXXON RESEARCH + ENGINEERING CO.	2
HARTUNG, KUHN + CO. MASCHINENFABRIK GMBH	2
STANDARD OIL COMPANY	2
HOOGOVENS IJMUIDEN B.V.	2
WESTVACO CORPORATION	2
DIDIER ENGINEERING GMBH	2
LAMPL, HELMA	2
MANNESMANN AKTIENGESELLSCHAFT	2

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AGENCE NATIONALE DE VALORISATION DE LA RECHERE (ANVAR)
3910849 - METHOD FOR MANUFACTURE OF ACTIVATED CARBON AND APPARATUS THEREFOR
3945810 - APPARATUS FOR DISPOSAL OF PLASTICS
4082615 - THERMAL DECOMPOSITION PROCESS AND APPARATUS FOR ORGANIC SOLID MATERIALS

ALCAN RESEARCH AND DEVELOPMENT, LIMITED
4012202 - PYROSCRUBBER

ALLIS-CHALMERS CORPORATION
3560368 - TRAVELING GRATE METHOD FOR THE RECOVERY OF OIL FROM SHALE
3560369 - RETORTING OIL SHALE INCLUDING AGGLOMERATED FINES
3644193 - PROCESS AND APPARATUS FOR THE RECOVERY OF OIL FROM SHALE BY INDIRECT HEATING
3990865 - PROCESS FOR COAL GASIFICATION UTILIZING A ROTARY KILN

AMERICAN MINECHEM CORPORATION
4082515 - COKE OVEN SYSTEM AND AGGLOMERATING CARRYOVER FINES THEREIN

AMERICAN WAAGNER-BIRO COMPANY, INC.
3728230 - INDIRECTLY HEAT EXCHANGING PLURAL GAS STREAMS FOR DRY QUENCHING HOT COKE AND DRYING COAL
3793743 - APPARATUS FOR DRYING COAL
3800427 - METHOD OF DRYING COAL
3843458 - COAL TREATING METHOD AND APPARATUS FOR COKE PLANTS
3848344 - BUNKER-BOILER INSTALLATIONS
3888742 - POLLUTION-FREE COAL-PREHEATING WITH WASTE HEAT FROM DRY COKE-QUENCHING

BARNEBEY-CHENEY CO.
3525674 - SUBMERGED COMBUSTION CARBONIZATION
4038154 - PILE FURNACE

BERGWERKSVERBAND GMBH
3444048 - CONTINUOUS COKING APPARATUS
3661722 - APPARATUS FOR CARBONIZING CARBONACEOUS MATERIALS WITH DIRECT CONTACT HEAT EXCHANGE MATERIAL
3792769 - COKING OVEN
3800428 - PROCESS FOR COOLING HOT BRIQUETTES
4102751 - COKE OVEN BATTERY WITH CONTROL MEANS FOR CHANGING THE HEAT SUPPLY

BETHLEHEM STEEL CORPORATION
3431180 - IMMERSION QUENCHING APPARATUS
3953299 - COKE OVEN HAVING A LOW BURNER HEATING WALL AND A HIGH BURNER HEATING WALL
4039391 - COKE OVEN BATTERY AND METHOD FOR OPERATION ON A SLOW-DOWN BASIS

BRICMONT + ASSOCIATES, INC.
3734834 - APPARATUS AND METHOD FOR APPLYING A FOAM COATING TO EJECTED HOT COKE

BUDWINE, W. J.
3763012 - APPARATUS FOR REMOVING POLLUTANTS FROM GASEOUS EFFLUENT

BUTTNER-SCHILDE-HAAS AG
4053364 - DRYING AND PREHEATING OF MOIST COAL AND QUENCHING OF THE FORMED COKE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CESKOSLOVENSKA AKADEMIE VED
3660245 - APPARATUS FOR CONTINUOUS MANUFACTURE OF FERFURAL AND ACETIC ACID

CHEVRON RESEARCH COMPANY
4056461 - RETORTING PROCESS UTILIZING A FLEXIBLE, HELICAL SHAPED CONVEYOR
4069133 - APPARATUS AND PROCESS FOR REDUCING PARTICULATES IN A VAPOROUS STREAM CONTAINING CONDENSABLE HYDROCARBONS

CITIES SERVICE RESEARCH AND DEVELOPMENT COMPANY
3784462 - PROCESS AND APPARATUS FOR OIL SHALE RETORTING

COAL INDUSTRY (PATENTS) LIMITED
4105419 - FLUIDIZED BED APPARATUS

COMPAGNIE INDUSTRIELLE DE PROCEDES + D APPLICATIONS S.A.
3840345 - SELF AGGLOMERATING FLUIDIZED BED REACTING APPARATUS

CONTINENTAL ENERGY CORPORATION, MESNE
3855071 - CARBONIZATION APPARATUS HAVING LOUVERS ON INTERNAL DUCT

CONTINENTAL OIL COMPANY
3565827 - PREPARATION OF ACTIVATED CARBON IN SERIALLY DISPOSED FLUIDIZED ZONES
3619405 - GAS COMBUSTION OIL SHALE RETORTING WITH EXTERNAL INDIRECT GAS HEAT EXCHANGE
4100035 - APPARATUS FOR QUENCHING DELAYED COKE

CPC INTERNATIONAL INC.
3816338 - PROCESS FOR THE REACTIVATION OF POWERED CARBON

CREATIVE ENTERPRISES INTERNATIONAL
3562115 - FLUIDIZED BED RETORT SURROUNDED BY A FLUIDIZED SAND HEAT EXCHANGER

DECO INDUSTRIES
4030984 - SCRAP-TIRE FEEDING AND COKING PROCESS

DEVCO MANAGEMENT INC., MESNE
3838015 - METHOD AND APPARATUS FOR PYROLYTIC DECOMPOSITION OF TRASH

DIDIER ENGINEERING GMBH
4070251 - INCLINED CHAMBER COKE OVEN
4098289 - CHANGEOVER DEVICE FOR CONTROLLING THE MOVEMENT OF DOSING FRAMES

DIDIER-KELLOGG INDUSTRIEANLAGENBAU GMBH
3849258 - RECUPERATIVE COKE OVEN

DIDIER-WERKE A.G.
3567588 - REGENERATIVE COKE FURNACE WITH UPPER AND LOWER LOCATED BURNING POINTS IN THE HEATING FLUES

DONNER-HANNA COKE CORPORATION
4113569 - COKE AIR POLLUTION CONTROL METHOD AND APPARATUS

DORR-OLIVER INCORPORATED
3904549 - FLUIDIZED BED REGENERATION OF POWDERED ACTIVATED CARBON

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

DRAVO CORPORATION
3746626 - POLLUTION CONTROL SYSTEM FOR DISCHARGING OPERATIONS OF COKE OVEN
3959084 - PROCESS FOR COOLING OF COKE
4087334 - SEAL ARRANGEMENT FOR A ROTARY DRUM ASSEMBLY

DR. C. OTTO COMP. G.M.B.H.
3547782 - COKED CHARGE RECEIVING CARRIAGE, ESPECIALLY FOR USE IN CONNECTION WITH COKE OVEN BATTERIES
3715282 - COKE CAR WITH FUME-COLLECTING HOOD
3716457 - APPARATUS FOR PREVENTING AIR POLLUTION DURING COKE OVEN DISCHARGE
3721609 - POLLUTION FREE COKE QUENCHING CAR
3730847 - PLURAL GAS MAINS FOR INDEPENDENTLY OPERATING LOW AND HIGH BURNERS IN ALTERNATIVE FLUE
3748235 - POLLUTION FREE DISCHARGING AND QUENCHING SYSTEM
3766018 - COKE QUENCHING APPARATUS
3801473 - EXHAUST HOOD FOR COKE OVEN QUENCHING CAR
3806032 - COKE QUENCHING TOWER
3809619 - COMBINED WET AND DRY QUENCHING
3809620 - HORIZONTAL COKE OVEN
3838017 - REGENERATOR FOR COKE OVENS
3839161 - SMOKE HOOD FOR COKE OVENS
3843460 - APPARATUS FOR TRANSPORTING AND QUENCHING COKE PUSHED FROM HORIZONTAL COKING CHAMBERS
3875016 - METHOD AND APPARATUS FOR CONTROLLING THE OPERATION OF REGENERATIVELY HEATED COKE OVENS
3876143 - PROCESS FOR QUENCHING HOT COKE FROM COKE OVENS
3969191 - CONTROL FOR REGENERATORS OF A HORIZONTAL COKE OVEN
3969192 - PROCESS AND APPARATUS FOR QUENCHING HOT COKE
3994700 - APPARATUS FOR THE LOW TEMPERATURE CARBONIZATION OF FINE-GRAIN FUELS
3996109 - COKE OVEN BATTERY HAVING TWIN HEATING FLUES
4003803 - CONTROL SYSTEM FOR PREVENTING AN EXCESSIVE TEMPERATURE RISE IN A BATTERY OF COKE OVENS
4004983 - COKE OVEN BATTERY
4014750 - SUPPORT APPARATUS FOR A BATTERY OF COKE OVENS
4059885 - PROCESS FOR PARTIAL RESTORATION OF A COKE OVEN BATTERY
4093519 - DECARBONIZING APPARATUS FOR AN UNDERJET-TYPE OF COKE OVEN BATTERY
4111758 - APPARATUS FOR THE UNIFORM DISTRIBUTION OF COMBUSTION MEDIA IN A BATTERY OF COKE OVENS
4113570 - RICH-GAS BURNER ARRANGEMENT IN HEATING FLUES FOR COKE OVEN CHAMBERS

E/M LUBRICANTS, INC.
3977885 - GLASS MANUFACTURING COMPOSITION

ENERGY RECOVERY RESEARCH GROUP, INC.
4123332 - PROCESS AND APPARATUS FOR CARBONIZING A COMMINUTED SOLID CARBONIZABLE MATERIAL

ESCHWEILER BERGWERKS VEREIN AKTIENGESELLSCHAFT
3959083 - METHOD AND APPARATUS FOR QUENCHING OF HEATED BULK MATERIALS

ETABLISSEMENT CAPITROP
4126518 - METHOD AND INCLINED CHAMBER FURNACE FOR CARBONIZING FLUENT CARBON-CONTAINING MATERIAL

EXXON RESEARCH + ENGINEERING CO.
3443908 - APPARATUS FOR THE PRODUCTION OF PETROLEUM COKE HAVING AN IMPROVED PRECOMBUSTOR
4007093 - FURNACE FOR THERMAL PROCESSING OF LUMP SOLID FUEL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

FAWKHAM DEVELOPMENTS LIMITED
3595542 - PREHEATER USING DOWNWARDLY FLOWING, DIRECTLY CONTACTING, FLUIDIZING VAPORS FROM CALCINING STAGE OF CALCEROUS MATERIAL

FIRMA CARL STILL
3461037 - INCLINED ROTARY FURNACE
3630852 - POLLUTION FREE DISCHARGING AND QUENCHING APPARATUS
3652403 - METHOD AND APPARATUS FOR THE EVACUATION OF COKE FROM A FURNACE CHAMBER
3684664 - QUENCH CHAMBER CONSTRUCTION FOR THE QUENCHING OF COKE
3772155 - APPARATUS FOR EJECTING COKE FROM A COKING FURNACE
3801470 - HEATING ARRANGEMENT FOR REGENERATIVE COKE OVEN BATTERIES HEATED WITH RICH GAS OR LEAN GAS
3809622 - APPARATUS FOR EMPTYING COKE FURNACE BATTERIES
3935078 - WASTE HEAT EXHAUST SYSTEM FOR SIDE BURNER REGENERATIVE COKE OVEN BATTERIES HAVING A DIVIDED HEATING SYSTEM
4008129 - INTERMEDIATE HEAD FOR COKE OVEN BATTERIES
4028192 - APPARATUS FOR RECEIVING INCANDESCENT COKE FROM RESPECTIVE COKE OVENS IN A BATTERY AND FOR REMOVING THE COKE IN A CLOSED CHAMBER AWAY FROM THE BATTERY
4050990 - METHOD AND APPARATUS FOR PRODUCING FORM COKE
4050992 - HOUSING CONSTRUCTION EXTENDING OVER THE COKE DISCHARGE AREA OF A HORIZONTAL COKE OVEN BATTERY
4105504 - APPARATUS FOR PRODUCING FORM COKE
4115202 - APPARATUS FOR PRODUCING NON-ABRASIVE COKE FORMS FROM BROWN-COAL BRIQUETS

FIRMA HARTUNG, KUHN CO. GMBH
3970526 - CLOSED TANK COKE CAR CONSTRUCTION

FMC CORPORATION
3721608 - FLUIDIZING DEVICES FOR FLUID BEDS, WITH IN-PROCESS CLEANING

FOREST FUELS, INC.
4095958 - APPARATUS AND METHOD FOR PRODUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

FUJI KASUI ENGINEERING CO., LTD.
3997407 - APPARATUS FOR DISPOSAL OF RUBBER WASTE

GOSUDARSTVENNY VSESOJUZNY INSTITUT PO
3544429 - BATTERIES OF COKE OVENS

GRAY MANUFACTURING COMPANY, INC.
3707355 - REACTOR APPARATUS

GREAT CANADIAN OIL SANDS LIMITED
3936358 - METHOD OF CONTROLLING THE FEED RATE OF QUENCH WATER TO A COKING DRUM IN RESPONSE TO THE INTERNAL PRESSURE THEREIN

GREAT LAKES CARBON CORPORATION
3844901 - COKE OVEN EMISSION CONTROL SYSTEM
3896556 - COOLING AND DE-DUSTING OF HOT PARTICULATE MATERIAL PARTICULARLY CALCINED PETROLEUM COKE
3953928 - COOLING OF HOT PARTICULATE MATERIAL PARTICULARLY CALCINED PETROLEUM COKE,
4053365 - ROTARY CALCINER

HARTUNG, KUHN + CO. MASCHINENFABRIK GMBH
3675400 - COLLECTING HOOD FOR COKE-QUENCHING CARS
3844900 - COKING INSTALLATION

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

HEINRICH KOOPERS GMBH
3607660 - PROCESS FOR REGULATING THE TEMPERATURE OF A COKE OVEN CHAMBER
3619375 - PROCESS FOR MAINTAINING TEMPERATURE DIFFERENTIAL IN COKING CHAMBER OF HORIZONTAL COKING OVEN
3661720 - APPARATUS FOR CONTROLLING THE SIZE OF GAS FLOW OPENINGS IN THE HEATING WALLS OF A COKE OVEN
3676305 - DUST COLLECTOR FOR A BY-PRODUCT COKE OVEN
3700219 - APPARATUS FOR CONTROLLING THE FLOW OF GAS BETWEEN FLUES IN THE HEATING CHAMBERS OF A REGENERATIVE COKE OVEN
3780888 - MATERIAL TRANSFER APPARATUS FOR A ROTARY DRUM
3839156 - PROCESS AND APPARATUS FOR CONTROLLING THE HEATING OF A HORIZONTAL BY-PRODUCT COKE OVEN
3841975 - HORIZONTAL COKE OVEN WITH VARIABLE BURNERS ALONG THE FLUE LENGHT
3988211 - APPARATUS FOR QUENCHING COKE PUSHED FROM COKE OVENS

HERCULES INCORPORATED
3736111 - PROCESS AND APPARATUS FOR THE COMPLETE RECLAMATION OF VALUABLE PRODUCTS FROM SOLID WASTE

HOOGOVENS IJMUIDEN B.V.
3959082 - METHOD OF OPERATING A BATTERY OF COKE OVENS
4021309 - AUTOMATIC COKE OVEN PLANT WITH MEANS TO INSURE SUFFICIENT COKING

HOUILLERES DU BASSIN DE LORRAINE
4038153 - COKE MANUFACTURING PROCESS

HYDRO CHEMICAL + MINERAL CORPORATION
3627646 - MULTISTAGE COLUMNAR FLASH EVAPORATORS AND CONDENSERS WITH INTERSPERSED STAGING

INDUSTRIAL FILTER AND PUMP MFG. CO.
3760566 - EVAPORATOR AND ENTRAINMENT SEPARATOR

INGERSOLL-RAND RESEARCH INC.
3976548 - APPARATUS FOR PROCESSING COAL AND LIKE MATERIAL
4106997 - METHODS FOR CONVERTING COAL TO A PLASTIC-LIKE CONDITION AND FEEDING SAME TO A RECEIVER

INSTITUT NATIONAL DE L INDUSTRIE CHARBONNIERE
3535209 - METHOD AND APPARATUS FOR THE HIGH-SPEED CARBONISATION OF SOLID FUELS OF SMALL PARTICLE SIZE SUCH AS COAL

INTERLAKE INC.
3843461 - COKE QUENCHING SYSTEM
3869352 - POLLUTION-FREE COKE QUENCHING SYSTEM
3966563 - COKE GUIDE SPRAY SYSTEM

INTERNATIONAL OILS EXPLORATION N.L.
3966561 - APPARATUS FOR THE CARBONIZATION OF COAL

KAEHR; PHILLIP
4000705 - PROCESS FOR DISPOSING OF ANIMAL CARCASSES

KAISER ALUMINUM + CHEMICAL CORPORATION
4016003 - BENEFICIATION OF METAL SCRAP

KERR-MCGEE CORPORATION
4092237 - PROCESS FOR TREATING OIL SHALES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

KINGSFORD COMPANY
3977947 - FLUIDIZED BED CARBONIZATION

KONINKLIJKE NEDERLANDSCHE HOOGOVENS EN STAALFABRIEKEN N.V.
3862015 - QUENCHING TOWER FOR QUENCHING COKE AND SIMILAR MATERIALS, AND A QUENCHING DEVICE AS PART OF SUCH A TOWER

KOPPELMAN; EDWARD
4069107 - CONTINUOUS THERMAL REACTOR SYSTEM AND METHOD
4106999 - CONTINUOUS THERMAL REACTOR
4126519 - APPARATUS AND METHOD FOR THERMAL TREATMENT OF ORGANIC CARBONACEOUS MATERIAL

KOPPERS COMPANY INC.
3433714 - HIGH CHAMBERED COKE OVEN
3433715 - HEATING HIGH CHAMBERED HORIZONTAL COKE OVENS
3433716 - APPARATUS FOR REMOTELY SHIFTING REGENERATIVE COKE OVEN BATTERIES FROM RICH FUEL GAS HEATING TO LEAN FUEL GAS HEATING
3494834 - COKE OVEN STRUCTURE WITH EXTERNAL FUEL LINE FOR LOW BURNERS
3496067 - HORIZONTAL COKE OVEN HAVING PLURAL TYPES OF BRICK LININGS FOR HEATING WALLS
3519539 - APPARATUS FOR RETORTING OIL SHALE HAVING A CENTRAL AXIAL HOLLOW COLUMN
3519541 - HORIZONTAL COKE OVEN HAVING PLURAL ADJUSTABLE OPENING IN HEATING WALL
3546092 - OIL SHALE RETORTING METHOD AND
3553083 - DOOR JAMB STRUCTURE FOR COKE OVEN BATTERY
3556947 - METHOD FOR REGULATING THE HEATING OF COKE OVENS
3577784 - METHOD AND APPARATUS FOR MEASURING COKE OVEN FLUE WALL TEMPERATURES
3580813 - CONDITION RESPONSIVE WATER QUENCH IN A CLOSED COKE COOLING SYSTEM
3591462 - METHOD AND APPARATUS FOR THE CONTINUOUS CARBONIZATION OF COAL
3629094 - COKE OVEN DOOR
3630222 - APPARATUS FOR SWITCHING FROM LEAN GAS TO RICH GAS BURNING IN A COKE OVEN BATTERY
3751342 - REVERSING MECHANISM FOR COKE OVEN BATTERY
3785933 - APPARATUS FOR COLLECTING AND REMOVING EFFLUENT EMITTED WHILE PUSHING COKE
3788236 - COKE QUENCHING CAR
3806426 - GAS FLOW THROUGH HORIZONTAL COKE OVEN REGENERATOR SECTIONS
3812018 - MULTI-STAGE COKE COOLER
3833478 - REVERSING MECHANISM FOR COKE OVEN BATTERY
3834993 - COMBUSTION SYSTEM FOR COKE OVEN
3839158 - COKE OVEN HEATING SYSTEM
3846252 - COKE DISCHARGING SYSTEM
3852159 - COKE QUENCHING CAR ALIGNMENT INDICATING SYSTEM
3878053 - REFRACTORY SHAPES AND JAMB STRUCTURE OF COKE OVEN BATTERY HEATING WALL
3895448 - DRY COKE COOLER
3897311 - PUSHER RAM AND QUENCH CAR TRAVEL SYNCHRONIZATION SYSTEM
3914159 - REVERSING CLUTCH
3930961 - HOODED QUENCHING WHARF FOR COKE SIDE EMISSION CONTROL
3963582 - METHOD AND APPARATUS FOR SUPPRESSING THE DEPOSITION OF CARBONACEOUS MATERIAL IN A COKE OVEN BATTERY
3984289 - COKE QUENCHER CAR APPARATUS
4004985 - SYSTEM FOR QUENCHING HOT COKE
4024023 - APPARATUS AND METHOD FOR TRANSFERRING HOT COKE TO A DRY COKE COOLER
4049501 - DEVICE FOR SPOTTING WITHIN TOLERANCE APPARATUS ASSOCIATED WITH THE COKE OVEN CHAMBERS OF A BATTERY
4061544 - APPARATUS FOR PROVIDING WASTE GAS RECIRCULATION IN COKE OVEN BATTERIES
4083753 - ONE-SPOT COKE QUENCHER CAR
4085008 - REVERSING METHOD AND APPARATUS FOR THE AUTOMATIC HEATING CHANGE-OVER OF A COKE OVEN BATTERY
4108733 - HIGH EFFICIENCY COKE OVEN REGENERATOR CHECKER BRICK

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

KOPPERS, HEINRICH, GESELLSCHAFT MIT BESCHRANKTER HAFTUNG
3723054 - INDUSTRIAL FURNACE
3840436 - APPARATUS FOR RECEIVING COKE PUSHED FROM HORIZONTAL COKE OVENS

KRUPP KOPPERS GMBH
4111756 - METHOD OF AND APPARATUS FOR HEATING UP A CHAMBER OF A COKING BATTERY

LAMPL; HELMA
4062304 - APPARATUS FOR THE PYROLYSIS OF WASTE PRODUCTS
4084521 - METHOD AND APPARATUS FOR THE PYROLYSIS OF WASTE PRODUCTS

LINDE AKTIENGESELLSCHAFT
3917516 - COKE-COOLING APPARATUS

MANNESMANN AKTIENGESELLSCHAFT
3890908 - METHOD AND APPARATUS FOR PYROLYTICALLY REDUCING WASTE
3971704 - METHOD AND APPARATUS FOR POLLUTION FREE, DESTRUCTIVELY PROCESSING WASTE

MARATHON OIL COMPANY
3448012 - ROTARY CONCENTRIC PARTITION IN A COKE OVEN HEARTH
3594287 - APPARATUS FOR COOLING SOLIDS BY DIRECT CONTACT WITH LIQUIDS
3612497 - CENTER FEED ROTARY HEARTH CALCINER
3652404 - DEVOLATILIZING PROCESS USING RABBLES AND FORMING DEVICES FOR CONVEYING MATERIALS
3652426 - PROCESS AND APPARATUS FOR REMOVAL OF VOLATILE MATTER BY ELECTRICAL RESISTANCE HEATING
3730849 - INTEGRAL CALCINED COKE COLLER
3745110 - THERMAL DECOKING OF DELAYED COKING DRUMS
3763011 - ROTARY HEARTH CALCINER HAVING STATIONARY SOAKING PIT
3763013 - NON CONCENTRIC DISCHARGE TABLE FOR ROTARY HEARTH CALCINER

MCDOWELL-WELLMAN ENGINEERING COMPANY
4013517 - CIRCULAR TRAVELING GRATE SINTERING MACHINE

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3655518 - RETORT SYSTEM FOR OIL SHALES AND THE LIKE
3756922 - MIXING NOZZLES FOR CARBONIZING FINE GRAIN FUELS IN A FLUIDIZED BED
3774315 - PROCESS AND APPARATUS FOR COOLING HOT BRIQUETTES

MICHIGAN OVEN COMPANY
3502846 - SMOKE GENERATOR

MINERAL CONCENTRATES + CHEMICAL COMPANY, INC.
4094769 - METHOD AND APPARATUS FOR RETORTING OIL SHALE

MOBIL OIL CORPORATION
3501394 - GAS LIFT RETORTING PROCESS FOR OBTAINING OIL FROM FINE PARTICLES CONTAINING HYDROCARBONACEOUS MATERIAL
3562143 - LIQUID DISENGAGING SYSTEM
3574087 - METHOD AND APPARATUS FOR RETORTING OIL SHALES

MONSANTO COMPANY
4083752 - ROTARY RETORT
4092098 - METHOD AND APPARATUS FOR IMPROVED IN SITU COMBUSTION OF PYROLYSIS GASES IN A KILN

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

NATIONAL RESEARCH DEVELOPMENT CORPORATION
3962045 - APPARATUS FOR PYROLYSIS OF DOMESTIC AND OTHER WASTE MATERIALS

NATIONAL STEEL CORPORATION
4010081 - APPARATUS FOR QUENCHING AND COOLING COKE
4113572 - POLLUTION CONTROL SYSTEM INCLUDING A ONE-SPOT QUENCH-CAR FOR COKE PRODUCING INSTALLATIONS

NICHOLS ENGINEERING + RESEARCH CORPORATION
4046085 - METHOD AND APPARATUS FOR TREATING WASTE MATERIAL IN A COUNTER-CURRENT INCINERATOR
4046086 - TREATMENT OF WASTE MATERIAL CONTAINING ALKALI METALS IN A CONTROLLED ATMOSPHERE FURNACE
4050389 - METHOD AND APPARATUS FOR INCINERATING WASTE MATERIAL
4115317 - METHOD AND APPARATUS FOR REGENERATING AND MANUFACTURING ACTIVATED CARBON

NIPPON KOKAN KABUSHIKI KAISHA
4009081 - DUST ARRESTING APPARATUS FOR A COKE DRY QUENCHING STATION
4045292 - METHOD FOR CONTROLLING COMBUSTION IN COKE OVEN BATTERY
4076593 - METHOD AND APPARATUS FOR CONTROLLING HEAT INPUT TO A WASTE HEAT BOILER BY USE OF BLEEDER GAS FROM A COKE DRY QUENCHING S TATION
4106998 - METHOD OF RESTRAINING EMISSION FROM COKE QUENCHING EQUIPMENT

NIPPON STEEL CORPORATION
3536590 - ANNULAR COKE OVEN CHAMBER WITH ROTATABLE TOP CHARGING HOOD AND ROTATABLE AND MOVABLE COKE DISCHARGE CONVEYOR MEANS
3541603 - APPARATUS FOR CONTINUOUS BAKING OF POWDERED OR GRANULAR RAW MATERIALS FOR PRODUCING IRON AND FOR PRODUCING COKE
4092222 - TOP DUST COLLECTING APPARATUS IN COKE QUENCHING SYSTEM

NORMAC, INC.
4050897 - REACTOR APPARATUS

OCCIDENTAL PETROLEUM CORPORATION
4039390 - FEED SYSTEM FOR PYROLYSIS REACTORS
4064018 - INTERNALLY CIRCULATING FAST FLUIDIZED BED FLASH PYROLYSIS REACTOR
4070250 - PYROLYSIS OF CARBONACEOUS MATERIALS IN A DOUBLE HELIX CYCLONE
4077847 - SOLID WASTE DISPOSAL SYSTEM
4078973 - LOOP PYROLYSIS PROCESS FOR ORGANIC SOLID WASTES
4083751 - CONTINUOUS FEED PYROLYSIS CHAMBER FOR DECOMPOSING SOLID WASTE
4088541 - APPARATUS FOR PYROLYZING ORGANIC SOLID WASTE
4101412 - PROCESS AND APPARATUS FOR RAPID PYROLYSIS OF CARBONACEOUS MATERIALS
4102773 - PYROLYSIS WITH CYCLONE BURNER
4105502 - SIMPLIFIED LIQUEFACTION PYROLYSIS PROCESS AND APPARATUS THEREFOR
4116823 - VESSEL FOR STRIPPING OIL FROM FLUIDIZED ASH AND CHAR PARTICLES

OIL SHALE CORPORATION
3496094 - APPARATUS AND METHOD FOR RETORTING SOLIDS
3616266 - HORIZONTAL RETORT WITH SOLID HEAT TRANSFER MEDIUM

PARAHO CORPORATION
4090945 - METHOD OF OPERATING AN OIL SHALE KILN

PEABODY COAL COMPANY
3434931 - COKE, TAR, AND CLEAN COAL GAS PRODUCING METHOD AND APPARATUS
3434933 - METHOD FOR PRODUCING HIGH YIELD COKE BY DOWNDRAFTING OF HOT GASES
3839157 - WATER SPRAY OVER TRANSFER MECHANISM FOR COOLING CHARS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING
(CONTINUED)

PEABODY COAL COMPANY
4100034 - QUENCHING METHOD

PENNSYLVANIA COKE TECHNOLOGY, INC.
4045299 - SMOKELESS NON-RECOVERY TYPE COKE OVEN
4111757 - SMOKELESS AND NON-RECOVERY TYPE COKE OVEN BATTERY
4124450 - METHOD FOR PRODUCING COKE

PHILLIPS PETROLEUM COMPANY
3480512 - APPARATUS FOR EDUCING AND RECOVERING OIL FROM OIL-BEARING SOLIDS
3487001 - METHOD AND APPARATUS FOR REMOVING OIL FROM OIL-YIELDING SOLIDS
3491016 - PROCESS FOR TREATING CRUSHED OIL SHALE

POLITECHNIKA SLASKA IM WINCENTEGO PSTROWSKIEGO
3988210 - FURNACE FOR MANUFACTURING HIGH CALORIFIC GAS AND COKE FROM COAL

PROCTER + GAMBLE COMPANY
3507937 - REVERSED ZWITTERIONIC PHOSPHORUS COMPOUNDS

PULLMAN, INCORPORATED
3887437 - TUNNEL KILN FIRING OF CARBON PRODUCTS

RECKLINGHAUSEN, CARL STILL, FIRMA
3846250 - COKE QUENCHING METHOD AND DEVICE

REDKER-YOUNG PROCESSES, INC.
4098649 - CONVERSION OF ORGANIC WASTE MATERIAL

RIEDHAMMER, LUDWIG, GMBH
3822190 - CALCINING OF CARBON SUBSTANCES AND CARBONACEOUS ROCKS IN A TUNNEL KILN

SALEM CORPORATION
3470068 - METHODS AND APPARATUS FOR THE CONTINUOUS TREAT- MENT OF NON-CAKING COAL AND OTHER DISCRETE MATERIALS
3475286 - ROTARY HEAT TREATING OVEN
3536592 - ROTARY COKE QUENCHING APPARATUS
3859172 - MULTIPLE RABBLED ROTARY HEARTH
3867261 - FUEL INCINERATION SYSTEM FOR CALCINER
3870604 - MOBILE ROTARY TYPE CONTINUOUS COKE QUENCHER
3998703 - METHOD OF TREATING MATERIALS ON A ROTARY HEARTH

SALEM FURNACE CO.
4096038 - METHOD AND APPARATUS FOR OPERATING A CALCINER UNDER A PRESSURE DIFFERENTIAL

SANYO KOKUSAKU PULP CO., LTD.
3971705 - METHOD OF PRODUCING CHAR FROM PULP MANUFACTURING WASTE LIQUOR

SCIENTIFIC RESEARCH INSTRUMENTS CORPORATION
3801469 - METHOD FOR EFFECTING CHEMICAL REACTIONS BETWEEN CASCADING SOLIDS AND COUNTERFLOWING GASES OR FLUIDS

SHELL OIL COMPANY
3640849 - SPENT SHALE RETORT WITH SONIC OSCILLATOR CLINKER CUTTER

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SOCIETA ITALIANA RESINE S.I.R. S.P.A.
3720586 - MULTIPLE EXPANSION FLASH EVAPORATOR COMPRISING A CONTINUOUS CASING WITH A CENTRAL EVAPORATION CHAMBER

SOUTHWIRE COMPANY
4021905 - METHOD OF STRAIGHTENING FLUE WALLS IN A CARBON ANODE RING FURNACE

STANDARD OIL COMPANY
3658654 - SCREW-CONVEYING RETORTING APPARATUS WITH HYDROGENATION MEANS
3994829 - PROCESS FOR PRODUCTION OF ACTIVATED CARBON

STEAG AG
4111665 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL, ESPECIALLY OF FINE COAL IN A GENERATOR

SUBURBAN MECHANICAL CONTRACTORS, INC.
3471369 - PRODUCTION OF CHAR

SUMITOMO ELECTRIC INDUSTRIES, LTD.
3984288 - METHOD FOR TREATMENT OF RUBBER AND PLASTIC WASTES

SUN OIL COMPANY OF PENNSYLVANIA
3449211 - APPARATUS FOR PYROLYSIS OF SOLIDS
3464892 - TUNNEL OVEN WITH A SERIES OF MOVING BARGES AND SEPARATE COMPARTMENTS
3623972 - TAR SAND RETORTING
3663421 - CONTINUOUS, FLUIDIZED PROCESS AND SYSTEM FOR THERMAL RECOVERY OF HYDROCARBONACEOUS

TAKEDA CHEMICAL INDUSTRIES LTD.
3541025 - PROCESS FOR PRODUCING ACTIVATED CARBON IN AN ASCENDING TURNING CURRENT OF ACTIVATING GAS
3676365 - METHOD FOR MANUFACTURING ACTIVATED CARBON AND APPARATUS THEREFOR
4007014 - ACTIVATED CARBON REVIVIFICATION EQUIPMENT

THAGARD TECHNOLOGY COMPANY
4057396 - FLUID-WALL REACTOR FOR HIGH TEMPERATURE CHEMICAL REACTION PROCESSES

TOLEDO PICKLING + STEEL SERVICE, INC.
4083693 - APPARATUS FOR TREATING WASTE ACIDS

TORRAX SYSTEMS, INC.
3702039 - PRODUCTION OF USABLE PRODUCTS FROM WASTE MATERIAL

UNION OIL COMPANY OF CALIFORNIA
3759795 - CALCINER-PREHEATER

UNITED STATES BORAX + CHEMICAL CORPORATION
3481878 - LAUNDRY COMPOSITIONS AND METHOD FOR MAKING SAME

UNITED STATES OF AMERICA, AGRICULTURE
3436313 - SURVIVAL STILL FOR OBTAINING POTABLE WATER

UNITED STATES OF AMERICA, ARMY
3694321 - PORTABLE DISTILLATION UNIT

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES STEEL CORPORATION
3806425 - QUENCHING COKE WITH SOLID STREAMS AND AVOIDING FLOODING
4025395 - METHOD FOR QUENCHING COKE
4039394 - SLATTED TOP QUENCH CAR
4096040 - TRIPPER BEAM
4096041 - SINGLE-SPOT QUENCH CAR

UNIVERSITY OF CALIFORNIA, THE REGENTS OF
3639111 - METHOD AND APPARATUS FOR PREVENTING FORMATION OF ATMOSPHERIC POLLUTANTS IN THE COMBUSTION OF ORGANIC MATERIAL

URBAN RESEARCH DEVELOPMENT CORPORATION
3926582 - METHOD AND APPARATUS FOR PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS

WALLACE-ATKINS OIL CORPORATION
4038152 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WASTE MATERIAL

WALLACE ENERGY CONVERSION, INC.
4118282 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF HIGH MOLECULAR WEIGHT ORGANIC MATERIALS

WATERFRONT N.V.
4122036 - METHOD OF PYROLYZING SEWAGE SLUDGE TO PRODUCE ACTIVATED CARBON

WESTVACO CORPORATION
3647716 - TRANSPORT REACTOR WITH A VENTURI/TUBE CONNECTION TO A COMBUSTION CHAMBER FOR PRODUCING ACTIVATED CARBON
3962128 - COAL DUST FUEL DISTRIBUTION SYSTEM AND METHOD OF MANUFACTURING ACTIVATED CARBON

WILPUTTE CORPORATION
3627668 - COKE BREEZE RECLAIMING SYSTEM
4087333 - TRAVELING HOOD FOR COKE OVEN EMISSION CONTROL
4104128 - APPARATUS AND METHOD FOR RECOVERY OF COAL FINES

WISE COAL + COKE COMPANY
3594286 - CARBONIZING MULTIPLE LAYERS OF MATERIAL BY MAINTAINING REDUCING ATMOSPHERE IN BED AND OXIDIZING ATMOSPHERE ABOVE BED

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
ANANIEV	LEONID	SEMENOVIC	ULITSA KOMSOMOLI, 15, KV. 12	ESTONSKAYA SSR, KOKH		SU
3993546 - SHAFT FURNACE FOR THERMOLYTIC DISTILLATION OF HYDROCARBON FUEL						
ANGELO	JAMES	F.	P.O. BOX 846	JONESBORO	AR	72401
4037543 - POLLUTION FREE COMBINATION CARBONIZATION APPARATUS AND FURNACE						
BACON	CONRAD	G.	2960 HANNAH AVE.	NORRISTOWN	PA	19403
4125437 - DISTILLATION SYSTEM						
BATORA	GUNTER		4, LANSTROPER STRASSE	4628 LUNEN		DT
3879267 - SHED FOR THE DISCHARGE SIDE OF A COKE OVEN BATTERY						
BAUER	JOCHEN		ROSASTR. 61	D-4300 ESSEN		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
CALDERON	ALBERT		1065 MELROSE DR.	BOWLING GREEN	OH	43402
4104130 - COKE QUENCHING CAR						
CALDERON	ALBERT		1065 MELROSE DRIVE	BOWLING GREEN	OH	43402
3972780 - POLLUTION CONTROL OF COKE OVENS						
3984310 - APPARATUS AND METHOD FOR MINIMIZING ACCUMULATION OF DEPOSITS BETWEEN THE DOOR AND JAMB OF A COKE OVEN AND FOR HEATING THE ENDS OF THE COKE OVEN						
CAUGHEY	ROBERT	A.	CLINTON ROAD	ANTRIM	NH	03440
4030895 - APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS						
DENNISON	CLIFFORD	C.	440 CENTENARY AVE.	CLEVELAND	TN	37311
3935077 - AUTOMATIC WATER DISTILLER						
DORFMAN	GERSH	ABRAMOVIC	ULITSA DMITRIEVSKAYA 20, KV. 1	KHARKOV		SU
3887438 - PLANT FOR DISCHARGING COKE FROM HORIZONTAL-FLUE COKE OVEN						
EFIMOV	VIKTOR	MIKHAILOV	ULITSA VYIDU, 4, KV. 5	ESTONSKAYA SSR, KOKH		SU
3993546 - SHAFT FURNACE FOR THERMOLYTIC DISTILLATION OF HYDROCARBON FUEL						
HALL	ROBERT	N.	3578 PERADA DRIVE	WALNUT CREEK	CA	94598
3976558 - METHOD AND APPARATUS FOR PYROLYZING OIL SHALE						
HANSON	LESTER		1903 PRINCETON AVE.	SALT LAKE CITY	UT	84108
4065361 - APPARATUS AND SYSTEM FOR PROCESSING OIL SHALE						
HOLTER	HEINZ		39-41 BEISENSTRASSE	GLABECK 439		DT
4053366 - COKE-OVEN PLANTS						
JABLIN	RICHARD		1438 MANOR LANE	BLUE BELL	PA	19422
4066513 - COKE QUENCHING STEAM GENERATOR						
KAIMANN	WALTER		POLLERBECKS BRINK 40	D-4300 ESSEN		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
KAUTZ	WALTER	C. JR.	21707 NW. 51ST AVE.	RIDGEFIELD	WA	98646
4050991 - PYROLYTIC REDUCER AND CONDENSER APPARATUS						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
KEMP	KLAUS	M.	2410 ANACAPA ST.	SANTA BARBARA	CA	93105
3945890 - CONVERTER SYSTEM						
KIRSCHMANN	JOHN	D.	933 ANDERSON ST.	BISMARCK	ND	58501
3980526 - LIQUID DISTILLATION APPARATUS						
KULAKOV	NIKOLAI	KONSTANTI	ULITSA DANILEVSKOGO 14, KV. 21	KHARKOV		SU
3887438 - PLANT FOR DISCHARGING COKE FROM HORIZONTAL-FLUE COKE OVEN						
LIKHOGUB	EVGENY	PETROVICH	ULITSA KOMMUNAINAYA 43, KV. 97	KHARKOV		SU
3887438 - PLANT FOR DISCHARGING COKE FROM HORIZONTAL-FLUE COKE OVEN						
LIN	KUO-CHUAN		NO. 10, LANE 177, PEI HSING ST	CHIA I, TAIWAN		CT
4010080 - SOLAR POWERED DISTILLING DEVICE						
MACDONALD	JAMES	E.	R.D. 4, BOX 93	LATROBE	PA	15650
3912597 - SMOKELESS NON-RECOVERY TYPE COKE OVEN						
MCFEE	RICHARD		852 OSTROM AVE.	SYRACUSE	NY	13210
4052267 - WATER DISTILLER						
MORRELL	JACQUE	C.	4501 CONNECTICUT AVE., NW., AP	WASHINGTON	DC	20008
4105536 - PROCESSES INCLUDING THE PRODUCTION OF NON-CONGEALING SHALE OIL FROM OIL SHALES						
NASHAN	GERD		24 HIRSCHKAMPSTRASSE	42 OBERHAUSEN		DT
3879267 - SHED FOR THE DISCHARGE SIDE OF A COKE OVEN BATTERY						
NAZININ	NIKOLAI	ANDREEVIC	ULITSA VYIDU, 12, KV. 30	ESTONSKAYA SSR, KOKH		SU
3993546 - SHAFT FURNACE FOR THERMOLYTIC DISTILLATION OF HYDROCARBON FUEL						
NEAL	DAVID	A.	11424 FREEWAY PL., NE.	ALBUQUERQUE	NM	87123
3983009 - METHOD AND APPARATUS FOR DESTRUCTIVE DISTILLATION OF SOLID WASTES AND RECOVERY OF DISTILLED PRODUCTS						
PAINTER	OLIVER	K.	101 N. CHURCH ST.	MOUNT PLEASANT	PA	15666
3912597 - SMOKELESS NON-RECOVERY TYPE COKE OVEN						
PASTERNAK	RUDOLF		LUBECKER STR. 15	D-4390 GLADBECK		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
PETER	HELMUT		20, AM HAGEN	4619 OBERADEN		DT
3879267 - SHED FOR THE DISCHARGE SIDE OF A COKE OVEN BATTERY						
REED	THOMAS	G. JR.	818 HEATHER COURT	HOUSTON	TX	77024
4058205 - APPARATUS FOR TREATING OIL SHALE						
ROOX	IVAR	KHARALDOV	ULITSA KOMSOMOLI, 27, KV. 24	ESTONSKAYA SSR, KOKH		SU
3993546 - SHAFT FURNACE FOR THERMOLYTIC DISTILLATION OF HYDROCARBON FUEL						
SAKAMOTO	MINORU		3911 NIOI PL.	HONOLULU	HI	96816
3870605 - COMBINATION SOLAR AND MANUAL DISTILLER AND RAIN CATCHER						
SANGA	YASUHIRO		19-26, 5-CHOME, SHAKUJIICHO	NERIMAKU, TOKYO		JA
3875077 - METHOD OF AND APPARATUS FOR PRODUCING ACTIVATED CHARCOAL FROM WASTE TIRES						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
SINGH	ALAMJIT	O.	P.O. BOX 1679	CHICAGO	IL	60690
3909364 - WASTE DISPOSAL METHOO AND APPARATUS						
4039392 - PROCESS ANO APPARATUS FOR PROOUCING CHAR AND CO-PRODUCTS FROM COAL ANO THE LIKE						
SMITH	DAVIO	E.	RT. 2	ROLLA	MO	65401
3901766 - METHOO AND APPARATUS FOR PROOUCING CHARCOAL						
STONE	PATRICK	L.	501 N. MISSISSIPPI	AOA	OK	74820
3983009 - METHOD AND APPARATUS FOR DESTRUCTIVE DISTILLATION OF SOLIO WASTES ANO RECOVERY OF OISTILLEO PROOUCTS						
STORRS	KINDRED	L.	881 SECONO AVE.	SALT LAKE CITY	UT	84103
3985637 - PROCESS FOR SEPARATING ANO RECOVERING LIQUIO PROOUCTS FROM SOLIO ANO LIQUID SUBSTANCES						
STOUT	VINCENT	H.	1003 SIERRA DRIVE	RIVERTON	WY	82501
3977960 - HYOROCARBON RECOVERY SYSTEM						
SUSLOV	ALEXANDR	NIKOLAEVI	ULITSA KARLA MARXA, 38E, KV. 4	KHARKOV		SU
3887438 - PLANT FOR OISCHARGING COKE FROM HORIZONTAL-FLUE COKE OVEN						
TSAY	YAW	JENN	NO. 10, LANE 177, PEI HSING ST	CHIA I, TAIWAN		CT
4010080 - SOLAR POWEREO DISTILLING OEVICE						
VOLMARI	JOSEF		16 HEIDELBEERWEG	463 BOCHUM		OT
3879267 - SHED FOR THE OISCHARGE SIOE OF A COKE OVEN BATTERY						
WEISS	GUNTHER		2025 SW. BRIGGS CT.	BEAVERTON	OR	97005
4081331 - PORTABLE WATER OISTILLATION APPARATUS						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3431177 - HORIZONTAL COKE OVENS WITH CONTROLLEO TWO STAGE HEATING ANO AIR AOMISSION
3431178 - COMPOUNO COKE OVEN BATTERY WITH CONTROLLEO TWO STAGE
3433713 - GRAVITY-FLOW CALCINER AND PROCESS FOR CALCINING CARBONACEOUS SOLIDS
3436314 - TECHNIQUE FOR CONVERTING BAGASSE ANO OTHER MOIST PLANT SUBSTANCES INTO CHARCOAL
3461606 - ROOT WATERING OEVICE
3462346 - SMOKELESS COKE OVENS
3475279 - RECOVERY PROCESS AND APPARATUS
3475317 - METHOD ANO APPARATUS FOR OF SOLIO HYOROCARBONACEOUS MATERIALS INCLUOING REACTIONS BETWEEN GASES AND UNSIZEO SO LIDS AND THE PHYSICAL SEPARATION THEREOF
3476651 - CONVEYING COKING APPARATUS WITH A OOWNWAROLY EXTENOING TUBULAR HEATING MEANS
3476652 - HORIZONTAL COKE OVEN BATTERIES
3488259 - VERTICAL FLUE COKE OVEN HAVING BURNERS OF ENLARGEO OIMENSIONS
3494833 - COKE OVEN BATTERY INCLUDING HIGH ANO LOW RICH GAS BURNERS
3501381 - SOLAR STILL WITH FLOATING SLAB-SUPPORTING PARTICULATE RAOIANT ENERGY RECEPTOR
3503852 - HORIZONTAL COKE OVEN HAVING THICKENEO EXTREME ENOS FIRING CHANNEL WALLS
3506542 - METHOO FOR CONTROLLING THE REAOINESS OF THE COKE MASS IN THE CHAMBER OF A HORIZONTAL COKE OVEN
3509027 - OIL SHALE RETORTING APPARATUS HAVING FRUSTO- CONICAL PASSAGES
3519540 - CARBONIZING OVEN HAVING PARALLEL HORIZONTAL FLUES AND U-SHAPEO AIR OUCTS
3528251 - SALT WATER IRRIGATION SYSTEM
3560347 - APPARATUS FOR CARBONIZING CARBONACEOUS MATERIALS USING MICROWAVE ENERGY

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3560348 - BATTERY OF COKE OVENS
3592742 - FOUNDATION COOLING SYSTEM FOR SOLE FLUE COKING OVENS
3597327 - PROCESS FOR PYROLYZING A SOLID OR LIQUID HYDROCARBONACEOUS FUEL IN A FLUIDIZED BED
3622509 - MECHANISM AND METHOD FOR A CHAR-RECYCLING COUNTER- FLOW WATER CLARIFIER
3635799 - PORTABLE STILL WITH CONCENTRIC VAPORIZING RESERVOIR AND COLLECTION CHAMBERS
3645854 - METHOD IN BY-PRODUCT COKE OVEN OPERATION AND APPARATUS FOR SAME
3652447 - PROCESS FOR EXTRACTING OIL FROM OIL SHALE
3661719 - NON-POLLUTING BY-PRODUCT COAL CARBONIZATION PLANT
3672959 - PORTABLE DISTILLERY
3689365 - REGENERATIVE COKE FURNACE AND METHOD OF HEATING IT
3691019 - RETORTING APPARATUS WITH HOOD-SHAPED UNITARY COOLANT JACKET DISPOSED OVER SCREW CONVEYOR
3734833 - LOW SULPHUR FUEL SYSTEM
3740184 - HIGH TEMPERATURE RABBLE DESIGN
3761359 - METHOD AND APPARATUS FOR HEAT-TREATING MATERIALS
3787292 - APPARATUS FOR PYROLYSIS OF WASTES
3794565 - APPARATUS FOR PROCESSING HEAT-DECOMPOSABLE NON-GASEOUS MATERIALS
3801472 - APPARATUS FOR SMOKELESS PUSHING AND TRANSPORTATION OF HOT COKE
3830705 - WATER DISTILLER
3836435 - METHOD OF HEAT TREATMENT OF COAL
3838016 - WATER STILL
3847752 - AIR DIFFUSION IN ROTARY HEARTH CALCINER
3850755 - APPARATUS FOR PYROLYTIC DECOMPOSITION OR HEAT TREATMENT OF MATERIAL

3072540	3073751	3073756	3075889	3087868	3089250	3090731	3098799	3102846	3108930	3109781	3110652
3115445	3115455	3123540	3130132	3130146	3133010	3140240	3140987	3141834	3148128	3150063	3167486
3167515	3167588	3170850	3170851	3171795	3172823	3175959	3175961	3177128	3178361	3179391	3183175
3190814	3190815	3192127	3192129	3192134	3196086	3199850	3199958	3200049	3201329	3211632	3214353
3222260	3222261	3226212	3227627	3247079	3250686	3251751	3252872	3257309	3258409	3261763	3267019
3279892	3284317	3288686	3297550	3300391	3302936	3304240	3306346	3325376	3331754	3332853	3334025
3336206	3337418	3341635	3344039	3345051	3346481	3349022	3350279	3350280	3351536	3357897	3357898
3359184	3362887	3366372	3367844	3370937	3373086	3373087	3374151	3376202	3376353	3377266	3379622
3382156	3384467	3384557	3385767	3388958	3390056	3391076	3395083	3396099	3397117	3398058	3407122
3408260	3409509	3415719	3419475								

II.A. IN VITRO CONVERSION: OBTAINING LIQUID HYDROCARBONS
2. APPARATUS

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,133,719	Didier Engineering GmbH, Fed. Rep. Of Germany: Process And Apparatus For Charging Inclined Chamber Coke Oven
4,133,720	Wolfgang Franzer Bochum-Wattenscheid, and Hans J. Adamus, Essen Both of Fed. Rep. of Germany: Support Apparatus For A Battery Of Underjet Coke Ovens
4,135,982	Occidental Petroleum Corporation: Method For Preventing Plugging In The Pyrolysis Of Agglomerative Coals
4,135,984	John D. Kirschmann, 933 Anderson St., Bismarck, N. Dak.: Water Distiller
4,135,986	Koppers Company, Inc.: One-Spot Rotary Coke Quenching Car
4,137,052	Anthony A. DuPont, 12 Outrider Rd., Rolling Hills, CA 90274: Apparatus And System For Producing Coal Gas
4,139,419	Hutni Projekt Praha, Projekcnia inzenyrska organizace: Arrangement For Dosing A Coal Charge To A Coking Battery
4,140,478	Kobe Steel, Ltd: Process And Apparatus For Heating Solid Materials Containing Volatile Matters
4,141,694	Technology Application Services Corporation: Apparatus For The Gasification Of Carbonaceous Matter By Plasma Arc Pyrolysis
4,141,793	Nissho-Iwai, Ltd.: Process For Prepartion Of Coke And Carbonizer Therefor
4,141,794	Occidental Petroleum Corporation: Grid-Wall Pyrolysis Reactor
4,141,795	Nippon Kokan Kabushiki Kaisha, Japan: Dry Type Method For Quenching Coke
4,141,796	Bethlehem Steel Corporation: Coke Oven Emission Control Method And Apparatus
4,141,797	Dr. C. Otto & Co., GmbH, Fed. Rep. of Germany: Method Of Operating A Battery Of Coke Ovens

4,142,867 Karl Kiener, 7081 Goldshofe, Ostalbkreis, Germany: Apparatus For The Production OF Combustible Gas

4,142,942 Albert Calderon, 1065 Melrose Dr., Bowling Green, OH 43402: Method And Apparatus For Quenching Coke

4,145,195 Firma Carl Still: Adjustable Device For Removing Pollutants From Gases And Vapors Evolved During Coke Quenching Operations

4,145,256 Georgia Tech Research Inst.: Method And Apparatus For Producing A Carbonaceous Residue Product

4,145,274 Occcidental Petroleum Corporation: Pyrolysis With Staged Recovery

4,146,359 Occidental Petroleum Corporation: Method For Reacting Nongaseous Material With A Gaseous Reactant

4,146,460 Delbert D. Thomas, 152 Cameo Dr., Redlands, CA 92373: Oil Shale Retort Apparatus And Process

4,147,593 Occidental Petroleum Corporation: Flash Pyrolysis Of Organic Solid Waste Employing Ash Recycle

4,147,594 Koppers Company, Inc.: One-Spot Cylindrical Coke Quenching Car And Quenching Method

4,148,710 Occidental Oil Shale, Inc: Fluidized Bed Process For Retorting Oil Shale

4,149,845 Marathon Oil Company: Rabbles And Material Handling Systems Utilizing The Same

4,149,939 Salem Corporation: Method And Apparatus For Feeding An Oxidant Within A Furnace Enclosure

4,151,044 Occidental Research Corporation: Process For the Pyrolysis Of Carbonaceous Materials In A Double Helix Cyclone

4,151,045 Didier Engineering GmbH, Fed. Rep. Of Germany: Apparatus For Charging Inclined Chamber Coke Oven

4,152,122 Syngas International, Ltd: Apparatus For The Production Of Methane Containing Gas By Hydrogasification

4,159,306 Adolf H. Borst, Schloss Ramberg, 7322 Donzdorf, Fed. Rep. of Germany: Apparatus For The Production Of Activated Carbon

4,159,924 Firma Carl Still Recklinghausen, Fed. Rep. Of Germany: Combined Control Device For The Operation Of Coke Oven Batteries To Effect Switching Of The Regenerative Heating System From One Group Of Flues To Another And For Converting From One Heating Gas To Another

4,160,720 University of Utah: Process And Apparatus To Produce Synthetic Crude Oil From Tar Sands

4,161,441 Jacque C. Morrell, 4501 Conn. Ave, N.W., Wash., D.C. 20008: Process For The Production Of Distillate Fuels From Oil Shales And By-Product Therefrom

4,162,943 Occidental Petroleum Corporation: Slot Pyrolysis Reactor And Method Of Pyrolysis

4,162,960 Union Oil Company of California: Shale Retorting Process And Apparatus

4,163,693 Occidental Petroleum Corporation: Fluidizing A Mixture Of Particulate Coal And Char

4,163,694 Alexandr N. Minasov, ulitsa Ivanova, 12116 KV 59; Evgeny P. Likhogub, ultisa Slinka 2 KV 11; & Stanislav S. Sergeev ultisa Kosmonvtov 3 kv114, all of Kharkov, U.S.S.R.: Heating Wall For Coke Ovens

4,165,216 Enerco, Inc.: Continuous Drying And/Or Heating Apparatus

4,165,971 Projektierung Chemische Verfahrenstechnik GmbH, Fed. Rep. of Germany: Apparatus For The Gasification Of Carbonaceous Material

II. B. IN VITRO CONVERSION: OBTAINING FUEL GAS

1. PROCESSES

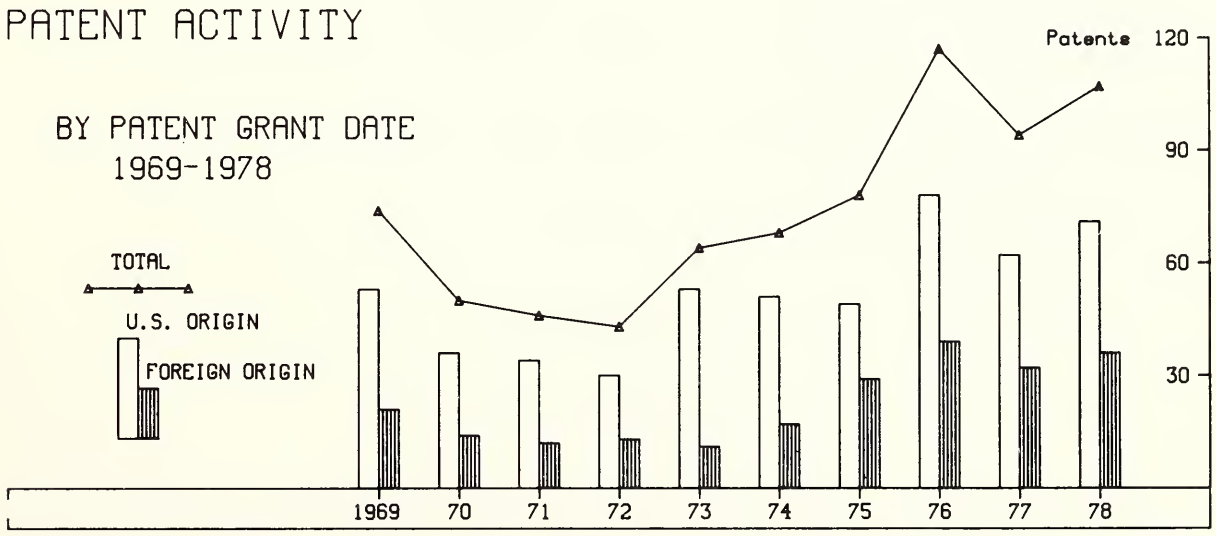
This profile includes conversion of solid carbonaceous material to fuel gas, i.e., gaseous mixtures containing hydrocarbons which are used for heating and illuminating. As such processes are often accomplished in two steps, that is, solid-to-liquid followed by liquid-to-gas, also included in this area are processes whereby fuel gas is produced from liquid, such as oil, or from a mixture of a solid and a liquid. Such processes are normally thermal and carried out in a retort in the presence of a variety of reactants including hydrogen, carbon dioxide, water, air and steam.

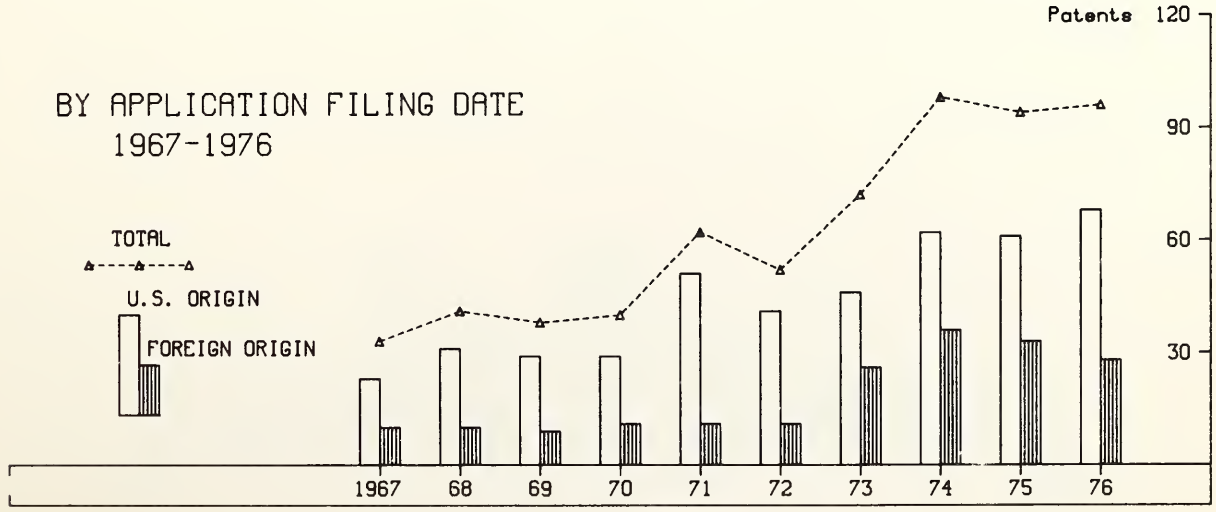
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 48, Subclasses 197R and 200-215

ACTIVITY INDICES (1976-1978)

GROWTH	42.9%
FOREIGN SHARE	33.6%
CORPORATE OWNED	85.2%
GOVERNMENT OWNED	4.7%
U.S. OWNED OF FOREIGN	8.4%





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	43	31	29	23	35	74	50	46	43	64	68	78	117	94	107	902
U.S. ORIGIN	23	23	22	18	28	53	36	34	30	53	51	49	78	62	71	631
FOREIGN ORIGIN	20	8	7	5	7	21	14	12	13	11	17	29	39	32	36	271
GERMANY	7	2	2			3	4	3	4	6	1	8	14	18	13	85
UNITED KINGDOM	5	2	3	2	5	8	5	3	2		6	5	8	2	8	64
JAPAN	1	1	1	2	1	1	3	2	1	1	5	9	12	8	11	59
FRANCE	1	1		1	1	4	2	2	4	1	1	1			1	20
NETHERLANDS	3	1				1		1	1			3	2	2	1	15
DENMARK						3				2		1			1	7
CANADA									1		3	1	1			6
SWEDEN	3													1		4
ITALY		1				1		1			1					4
U.S.S.R.										1		1				2
AUSTRALIA													1	1		2
SWITZERLAND			1													1
RHODESIA															1	1
SOUTH AFRICA													1			1
U.S. ORIGIN	23	23	22	18	28	53	36	34	30	53	51	49	78	62	71	631
U.S. CORP. OWNED	21	23	17	17	22	43	32	31	21	44	40	46	56	47	61	521
U.S. GOVT. OWNED			1			4	2	2	1	4	5	1	13	1	1	35
U.S. INDIV. OWNED	2		3	1	5	6	2	1	8	5	6	2	9	12	8	70
FOREIGN OWNED			1		1									2	1	5
FOREIGN ORIGIN	20	8	7	5	7	21	14	12	13	11	17	29	39	32	36	271
U.S. OWNED	2	2	2		1	2	1	2		1	5	6	5		4	33
FOREIGN OWNED	18	6	5	5	6	19	13	10	13	10	12	23	34	32	32	238
FOREIGN CORP.	17	5	3	5	6	16	12	9	11	8	11	20	33	31	31	218
FOREIGN GOVT.																
FOREIGN INDIV.	1	1	2			3	1	1	2	2	1	3	1	1	1	20

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	68	28	33	33	41	38	40	62	52	72	98	94	96	44		799
U.S. ORIGIN	49	20	25	23	31	29	29	51	41	46	62	61	68	28		563
FOREIGN ORIGIN	19	8	8	10	10	9	11	11	11	26	36	33	28	16		236
GERMANY	1	1	1	2	4	2	3	6	1	6	11	15	11	10		74
UNITED KINGDOM	10	2	5	3	1	3	1	1	4	5	7	3	7	2		54
JAPAN	4		1	1	3		2		2	10	14	9	6	4		56
FRANCE	1	3	1	4	1	2	2	2			1		1			18
NETHERLANDS		1				1	1			3	2	2	1			11
DENMARK	3						1	1		1		1				7
CANADA						1			3	1		1				6
SWEDEN													1			1
ITALY		1			1			1								3
U.S.S.R.							1		1							2
AUSTRALIA												1	1			2
SWITZERLAND																
RHODESIA											1					1
SOUTH AFRICA												1				1
U.S. ORIGIN	49	20	25	23	31	29	29	51	41	46	62	61	68	28		563
U.S. CORP. OWNED	44	16	21	19	26	25	26	39	30	41	50	41	58	24		460
U.S. GOVT. OWNED		1	1	2	3	2	2	2	5	1	5	8	2			34
U.S. INDIV. OWNED	5	2	3	2	2	2	1	10	6	4	7	10	7	4		65
FOREIGN OWNED		1										2	1			4
FOREIGN ORIGIN	19	8	8	10	10	9	11	11	11	26	36	33	28	16		236
U.S. OWNED	1	1	1	1		1	2	1	4	6	2	4	1	2		27
FOREIGN OWNED	18	7	7	9	10	8	9	10	7	20	34	29	27	14		209
FOREIGN CORP.	15	7	7	8	8	7	8	9	5	20	31	27	27	14		193
FOREIGN GOVT.																
FOREIGN INDIV.	3			1	2	1	1	1	2		3	2				16

II.B. IN VITRO CONVERSION - OBTAINING FUEL GAS
1. PROCESSES

ASSIGNEES WITH 4 OR MORE PATENTS (1/69-12/78)

EXXON RESEARCH + ENGINEERING CO.	72
TEXACO INC.	56
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	27
CHEVRON RESEARCH COMPANY	17
UNITED STATES OF AMERICA, INTERIOR	17
TEXACO DEVELOPMENT CORPORATION	17
PHILLIPS PETROLEUM COMPANY	16
INSTITUTE OF GAS TECHNOLOGY	14
BRITISH GAS CORPORATION	12
GAS COUNCIL	12
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	12*
OCCIDENTAL PETROLEUM CORPORATION	11
MOBIL OIL CORPORATION	11
JAPAN GASOLINE CO., LTD.	10
UOP INC.	9
PULLMAN, INCORPORATED	9
UNITED TECHNOLOGIES CORPORATION	9
SHELL OIL COMPANY	8
UNION CARBIDE CORPORATION	8
IMPERIAL CHEMICAL INDUSTRIES LIMITED	8
CONSOLIDATION COAL COMPANY	7
HYDROCARBON RESEARCH INC.	7
MITSUI SHIPBUILDING AND ENGINEERING CO. LTD.	6
CHEMICAL CONSTRUCTION CORPORATION	6
TEXAS INSTRUMENTS, INCORPORATED	5
KAMYR INC.	5
GULF OIL CORPORATION	5
GENERAL ELECTRIC COMPANY	5
DR. C. OTTO COMP. G.M.B.H.	5
LEAS BROTHERS DEVELOPMENT CORPORATION	5
SIEMENS AKTIENGESELLSCHAFT	5
FOSTER WHEELER ENERGY CORPORATION	5
LUMMUS COMPANY	5
AIR PRODUCTS + CHEMICALS, INC.	4
LA SOCIETE CHIMIQUE DE LA GRANDE PAROISSE, AZOTE	4
ROCKWELL INTERNATIONAL CORPORATION	4
KRUPP KOPPERS GMBH	4
ATLANTIC RICHFIELD COMPANY	4
UNION OIL COMPANY OF CALIFORNIA	4
BATTELLE DEVELOPMENT CORPORATION	4
WESTINGHOUSE ELECTRIC CORP.	4
COGAS DEVELOPMENT COMPANY	4
E. I. DU PONT DE NEMOURS AND COMPANY	4
TOYOTA JIDOSHA KOGYO KABUSHIKI KAISHA	4
CITIES SERVICE COMPANY	4
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ, B.V.	4*
COMBUSTION ENGINEERING INC.	4
RALPH M. PARSONS COMPANY	4*

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AGENCE NATIONALE OE VALORISATION OE LA RECHERE (ANVAR)
3843339 - PROCESS FOR FLUIOIZEO COMBUSTION OF PLASTICS

AIR PRODUCTS + CHEMICALS, INC.
3779725 - COAL GASSIFICATION
3871839 - METHOO OF FEEDING SOLID CARBONACEOUS MATERIAL TO A HIGH TEMPERATURE REACTION ZONE
3886756 - SEPARATION OF GASES
4025318 - GASIFICATION OF HYOROCARBON FEEDSTOCKS

ALLIED CHEMICAL CORPORATION
4071606 - SULFUR OIOXIOE WITH COAL
4089805 - PROCESS FOR PREPARING A GASIFORM HYDROCARBON FUEL FROM HYDROCARBON FUEL OIL

ALLIS-CHALMERS CORPORATION
3990865 - PROCESS FOR COAL GASIFICATION UTILIZING A ROTARY KILN

AMERICAN GAS ASSOCIATION, INC.
3922215 - PROCESS FOR PROOUCTION OF HYDROCARBON LIQUIDS AND GASES FROM OIL SHALE
3929615 - PROOUCTION OF HYOROCARBON GASES FROM OIL SHALE

ARTHUR O. LITTLE INC.
3712800 - METHOD FOR CONVERTING RESIOUAL OILS INTO FUEL GAS

ARTHUR G. MCKEE + COMPANY
4097361 - PRODUCTION OF LIQUID AND GASEOUS FUEL PRODUCTS FROM COAL OR THE LIKE

ATLANTIC RICHFIELO COMPANY
3503866 - PROCESS AND SYSTEM FOR PROOUCING SYNTHETIC CRUDE FROM COAL
3503867 - PROCESS ANO SYSTEM FOR PRODUCING SYNTHETIC CRUOE FROM COAL
3620697 - APPARATUS ANO METHOD FOR PROOUCING HYDROGEN
3730694 - FUEL GAS UPGRAOING

AZOTE ET PROOUITS CHIMIQUES S.A.
3695856 - MAGNESIA SUPPORTS FOR CATALYSTS IN HYDROCARBON REFORMING

BABCOCK + WILCOX CO.
3454383 - GASIFICATION METHOD AND APPARATUS
3904387 - FUEL GAS MANUFACTURE

BAMAG VERFAHRENSTECHNIK GMBH
4017272 - PROCESS FOR GASIFYING SOLIO CARBONACEOUS FUEL

BASF AKTIENGESELLSCHAFT
3912775 - CATALYST AND ITS USE FOR THE MANUFACTURE OF METHANE FROM GASES CONTAINING CARBON MONOXIDE AND DIOXIDE AND HYOROGEN
3990866 - CATALYST AND THE USE THEREOF FOR THE PRODUCTION OF GAS CONTAINING METHANE

BATTELLE OEVELOPMENT CORPORATION
3997582 - PROCESS ANO CATALYST FOR SYNTHESIZING A GASEOUS HYDROCARBON MIXTURE HAVING A HIGH METHANE CONTENT FROM CARBON MONOXIDE A NO HYOROGEN
4039302 - PROCESS AND CATALYST FOR SYNTHESIZING LOW BOILING (C1 TO C3) ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN
4077995 - PROCESS FOR SYNTHESIZING LOW BOILING ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN
4092125 - TREATING SOLID FUEL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

BECHTEL ASSOCIATES PROFESSIONAL CORPORATION
4017274 - PROCESS FOR THE METHANATION OF GASES CONTAINING HIGH CONCENTRATION OF CARBON MONOXIDE

BLACK CLAWSON COMPANY
3714038 - PROCESS AND PRODUCT FOR CONVERTING ORGANIC MATERIALS BY PYROLYSIS OR HYDROGENATION

BLUE EMBER FLAME CORPORATION
3933618 - GAS GENERATION APPARATUSES AND PROCESSES

BORGGREEN, GEORG
3771263 - METHOD FOR DISPOSAL OF REFUSE BY DEGASIFYING AND GASIFICATION THEREOF

BRITISH GAS CORPORATION
3830637 - FLUIDISED BED HYDROGENATION
3904554 - CATALYST OF RUTHENIUM AND ZINC OXIDE ON ALUMINA CARRIER FOR STEAM REFORMING HYDROCARBONS
3915670 - PRODUCTION OF GASES
3933446 - PROCESS FOR THE PRODUCTION OF A SUBSTITUTE NATURAL GAS
3942957 - PRODUCTION OF COMBUSTIBLE GASES
3942958 - COMPOSITION CONTROL OF GASES
4071329 - COAL GASIFICATION PLANT
4073627 - COAL GASIFICATION PLANT
4104201 - CATALYTIC STEAM REFORMING AND CATALYSTS THEREFOR
4105591 - METHOD OF PREPARING AND FILTERING COPRECIPITATED NICKEL-ALUMINA CATALYSTS
4127393 - METHOD AND APPARATUS FOR VAPORIZING HYDROCARBON BASED LIQUIDS
4129422 - COAL GASIFICATION PLANT

BROKEN HILL PROPRIETARY COMPANY LIMITED
4042344 - PROCESS FOR THE PRODUCTION OF GASEOUS MIXTURES

CALIFORNIA INSTITUTE OF TECHNOLOGY
3955941 - HYDROGEN RICH GAS GENERATOR

CAMERON ENGINEERS, INCORPORATED
3963426 - PROCESS FOR GASIFYING CARBONACEOUS MATTER

CATALYSTS AND CHEMICALS INC.
4024075 - CARBON AND EROSION-RESISTANT CATALYST

CHEMICAL CONSTRUCTION CORPORATION
3446747 - PROCESS AND APPARATUS FOR REFORMING HYDROCARBONS
3466159 - PROCESS AND CATALYST FOR PRODUCTION OF METHANE-RICH GAS
3531266 - PRODUCTION OF SYNTHETIC METHANOL
3573224 - PRODUCTION OF HYDROGEN-RICH SYNTHESIS GAS
3597465 - PRODUCTION OF SYNTHETIC METHANOL
3871172 - PROCESS WITH FLUIDIZED COMBUSTOR AND FLUIDIZED HEAT EXCHANGER FOR AIR

CHEM SYSTEMS INC.
3920716 - LIQUID PHASE METHANOL GASIFICATION

CHEVRON RESEARCH COMPANY
3531267 - PROCESS FOR MANUFACTURING FUEL GAS AND SYNTHESIS GAS
3537977 - REFINERY UTILIZING HYDROGEN PRODUCED FROM A PORTION OF THE FEED

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CHEVRON RESEARCH COMPANY (CONTINUED)
3605890 - HYDROGEN PRODUCTION FROM A KEROGEN-DEPLETED SHALE FORMATION
3615299 - HYDROGEN PRODUCTION BY REACTION OF CARBON WITH STEAM OR STEAM AND OXYGEN
3615300 - HYDROGEN PRODUCTION BY REACTION OF CARBON WITH STEAM AND OXYGEN
3698881 - SYNTHESIS GAS PRODUCTION
3759036 - POWER GENERATION
3759677 - CATALYTIC SYNTHESIS GAS MANUFACTURE
3765851 - GAS PRODUCTION
3775072 - GAS PRODUCTION
3801495 - INTEGRATED PROCESS COMBINING CATALYTIC CRACKING WITH HYDROTREATING
3817724 - GASIFICATION OF SOLID CARBONACEOUS WASTE MATERIAL
3817725 - GASIFICATION OF SOLID WASTE MATERIAL TO OBTAIN HIGH BTU PRODUCT GAS
3850588 - PRODUCTION OF SYNTHESIS GAS RICH IN CARBON MONOXIDE
3874116 - SYNTHESIS GAS MANUFACTURE
3907519 - GASIFICATION OF SOLID CARBONACEOUS MATERIALS TO OBTAIN HIGH BTU PRODUCT GAS
4002565 - WASTE-WATER PROCESS

CITIES SERVICE COMPANY
3628929 - METHOD FOR RECOVERY OF COAL ENERGY
3734184 - METHOD OF IN SITU COAL GASIFICATION
3775073 - IN SITU GASIFICATION OF COAL BY GAS FRACTURING
4040976 - PROCESS OF TREATING CARBONACEOUS MATERIAL WITH CARBON DIOXIDE

CITY OF KIRYU
3546812 - PROCESS FOR TREATING EXCREMENT BY MICROORGANISMS AND PRODUCTS OBTAINED THEREBY

COAL INDUSTRY (PATENTS) LIMITED
3970541 - GAS EXTRACTION OF COAL

COGAS DEVELOPMENT COMPANY
3850839 - MANUFACTURE OF SYNTHESIS GAS
3966633 - WASTE WATER PROCESSING
3966634 - GASIFICATION METHOD
3993583 - GASIFICATION OF ASH CONTAINING CARBONACEOUS SOLIDS

COMBUSTION ENGINEERING INC.
3818869 - METHOD OF OPERATING A COMBINED GASIFICATION-STEAM GENERATING PLANT
3864100 - METHOD AND APPARATUS FOR GASIFICATION OF PULVERIZED COAL
3920417 - METHOD OF GASIFYING CARBONACEOUS MATERIAL
4069024 - TWO-STAGE GASIFICATION SYSTEM

CON-GAS SERVICE CORPORATION
3421869 - METHOD FOR THE PRODUCTION OF A MIXTURE OF HYDROGEN AND STEAM

CONOCO METHANATION COMPANY
4127392 - METHANATION PROCESS START-UP

CONSOLIDATED NATURAL GAS SERVICE CO. INC.
3438759 - GAS REFORMER AND CONTROL MEANS
3820964 - REFUSE GASIFICATION PROCESS AND APPARATUS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CONSOLIDATION COAL COMPANY
3503724 - METHOD AND APPARATUS FOR PROOUCING MIXTURES OF METHANE, CARBON MONOXIDE, AND HYDROGEN
3615298 - GASIFICATION
3619142 - CONTINUOUS STEAM-IRON PROCESS
3692505 - FIXEO BED COAL GASIFICATION
3700422 - CONTINUOUS STEAM-IRON PROCESS FOR MAKING FUEL GAS
3920418 - PROCESS FOR MAKING LIQUIO AND GASEOUS FUELS FROM CAKING COALS
4008054 - PROCESS FOR MAKING LOW-SULFUR AND LOW-ASH FUELS

CONTINENTAL OIL COMPANY
3907920 - TWO-STAGE HYDROPYROLYSIS-CRACKING PROCESS FOR PRODUCING ETHYLENE
3977843 - PURIFICATION PROCESS FOR COAL GAS METHANATION
4120881 - PREDOMINANTLY ALIPHATIC LOWER HYDROCARBON MATERIALS FROM CARBONACEOUS SOLIDS

COPELAND SYSTEMS INCORPORATED
3949684 - METHOD FOR OXIDATION OF SULFUR-CONTAINING SUBSTANCES

OAIKYO OIL COMPANY LTO.
3957620 - PROCESS FOR TREATING HEAVY OIL

DAVY POWERGAS LIMITED
3930812 - METHANE SYNTHESIS
4021370 - FUEL GAS PROOUCTION

DESTRUGAS A/S
3744439 - METHOO OF SUPPLYING REFUSE TO A GAS PRODUCING CHAMBER FOR DISPOSAL OF THE REFUSE ANO A REFUSE DISPOSAL PLANT COMPRISING A GASIFICATION CHAMBER

OEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT VORMALS ROESSLER
3741736 - PROCESS ANO OEVICE FOR THE PRODUCTION OF ACETYLENE-ETHYLENE MIXTURES

OOW CHEMICAL COMPANY
3429942 - QUENCHING TECHNIQUE FOR HYORODEALKYLATION OF ALKYL AROMATIC HYOROCARBON

OR. C. OTTO COMP. G.M.B.H.
4013427 - SLAG BATH GENERATOR
4043766 - SLAG BATH GENERATOR
4049570 - METHOD ANO APPARATUS FOR REMOVING VAPORS AND AEROSOLS FROM GASES PRODUCED IN A GASIFICATION PLANT
4066420 - PROCESS FOR THE GASIFICATION OF SOLIO FUELS
4102674 - METHOD FOR HAROENING IRON ORE PELLETS

DYNECOLOGY INCORPORATED
4052173 - SIMULTANEOUS GASIFICATION OF COAL AND PYROLYSIS OF ORGANIC SOLID WASTE MATERIALS

ECOLAIRE INCORPORATED
4018588 - METHOD AND APPARATUS FOR HANOLING SLAG HANOLING

E. I. DU PONT DE NEMOURS ANO COMPANY
3421194 - PROCESS FOR TREATING A FILAMENTARY STRAND
3645915 - STABILIZED NICKEL OXIOE-NICKEL CHROMITE REFORMING CATALYST
3759678 - REFORMER CATALYST
3943236 - REFORMING PROCESS FOR CARBON MONOXIDE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

EISENWERK-GESELLSCHAFT MAXIMILIANSHUTTE MBH
4062657 - METHOD AND APPARATUS FOR DESULPHURIZING IN THE GASIFICATION OF COAL

ELECTRICITE DE FRANCE SERVICE NATIONAL
4092129 - PROCESS FOR PRODUCING METHANE RICH GAS

EL PASO NATURAL GAS COMPANY
4005996 - METHANATION PROCESS FOR THE PRODUCTION OF AN ALTERNATE FUEL FOR NATURAL GAS

ENGELHARD INDUSTRIES, INC.
3481722 - PROCESS FOR PRODUCING HYDROGEN

ENGELHARD MINERALS + CHEMICALS CORPORATION
3595805 - STEAM REFORMING WITH PRELIMINARY HYDRODESULFURIZATION
4073716 - PROCESS FOR PRODUCING SYNTHETIC NATURAL GAS AND HIGH OCTANE MOTOR FUEL COMPONENTS

ESSO STANDARD SOCIETE ANONYME FRANCAISE
3480419 - GASIFICATION OF HYDROCARBONS

ETHYL CORPORATION
3533765 - METHOD OF OPERATING AN ENGINE AND FUEL

EXXON RESEARCH + ENGINEERING CO.
3421870 - LOW-TEMPERATURE CCATALYTIC HYDROGENOLYSIS OF HYDROCARBONS TO METHANE
3423194 - ALUMINUM SIMULTANEOUSLY IMPREGNATED WITH SALTS OF NICKEL, ALUMINUM AND METAL PROMOTER
3444099 - EQUILIBRATION AND STEAM-REFORMING CATALYSTS
3449099 - PROCESS FOR REACTING HYDROCARBONS AND STEAM USING SPENT CATALYST FOR PRETREATING
3450514 - CONTROLLED CONVERSION OF LIGHT NAPHTHA TO TOWN GAS
3475126 - LOW-TEMPERATURE, LOW-PRESSURE VAPOR REFORMING
3475160 - METHOD OF PRODUCING FLUIDIZED BED REDUCTION OF ORES
3475319 - RETORTING OF OIL SHALE
3508873 - HYDROGEN PRODUCED IN AQUEOUS HYDROCARBON EMULSION MULTIBED REACTOR
3508889 - PROCESS FOR PRODUCING HIGH QUALITY TOWN GAS FOR DELIVERY
3540868 - CONTROL OF CARBON DEPOSITION IN CATALYST BEDS
3542532 - PROCESS FOR THE PRODUCTION OF HYDROGEN FROM PETROLEUM COKE
3661543 - FLUID COKING PROCESS INCORPORATING GASIFICATION OF PRODUCT ORE
3689240 - PRODUCTION OF METHANE RICH GASES
3694346 - INTEGRATED FLUID COKING/STEAM GASIFICATION PROCESS
3700583 - COAL LIQUEFACTION USING CARBON RADICAL SCAVENGERS
3702516 - GASEOUS PRODUCTS OF GASIFIER USED TO CONVEY COKE TO HEATER
3726791 - HYDROGEN PRODUCTION FROM AN INTEGRATED COKER GASIFIER SYSTEM
3733186 - TWO STEP CONTROLLED FLOW GASIFICATION PROCESS
3740193 - HYDROGEN PRODUCTION BY CATALYTIC STEAM GASIFICATION OF CARBONACEOUS MATERIALS
3752658 - INTEGRATED FLUID COKING-GASIFICATION PROCESS
3759676 - INTEGRATED FLUID COKING/GASIFICATION PROCESS
3779900 - PROCESS FOR FLUID COKING GASIFICATION IN AN INTEGRATED SYSTEM
3784676 - REMOVING SULPHUR FROM HYDROCARBONS
3803023 - STEAM GASIFICATION OF COKE
3807090 - PURIFICATIONS OF FUELS
3816084 - COKELESS COKER WITH RECYCLE OF COKE FROM GASIFIER TO HEATER
3816298 - HYDROCARBON CONVERSION PROCESS
3838993 - TWO STAGE PROCESS FOR THE CONVERSION OF HEAVY HYDROCARBONS TO A METHANE RICH GAS STREAM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

EXXON RESEARCH + ENGINEERING CO. (CONTINUED)

3838994 - CONVERSION OF HEAVY HYDROCARBONS TO A METHANE RICH GAS PRODUCT
3847566 - FLUIDIZED BED GASIFICATION PROCESS WITH REDUCTION OF FINES ENTRAINMENT BY UTILIZING A SEPARATE TRANSFER LINE BURNER STAGE
3847567 - CATALYTIC COAL HYDROGASIFICATION PROCESS
3847797 - VISBREAKING A HEAVY HYDROCARBON FEEDSTOCK IN A REGENERABLE MOLTEN MEDIUM
3850742 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIA
3852188 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIA
3864083 - CARBON DETECTION
3870480 - PROCESS AND APPARATUS FOR THE PRODUCTION OF COMBUSTIBLE GASES
3874739 - METHOD AND APPARATUS FOR THE TRANSFER OF ENTRAINED SOLIDS
3876392 - TRANSFER LINE BURNER USING GAS OF LOW OXYGEN CONTENT
3876527 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIUM
3890111 - TRANSFER LINE BURNER SYSTEM USING LOW OXYGEN CONTENT GAS
3890112 - TWO-STAGE PROCESS FOR THE CONVERSION OF LIQUID HYDROCARBON TO A METHANE RICH GAS STREAM
3891402 - TRANSFER LINE BURNER SYSTEM
3901667 - MANUFACTURE OF METHANE-CONTAINING GASES USING AN INTEGRATED FLUID COKING AND GASIFICATION PROCESS
3904744 - PROCESS FOR THE PRODUCTION OF HYDROGEN-CONTAINING GASES
3927996 - COAL INJECTION SYSTEM
3929431 - CATALYTIC REFORMING PROCESS
3932146 - PROCESS FOR THE FLUID BED GASIFICATION OF AGGLOMERATING COALS
3933445 - PROCESS AND APPARATUS FOR PREVENTING DEPOSITS ON A GAS INLET NOZZLE
3948759 - VISBREAKING A HEAVY HYDROCARBON FEEDSTOCK IN A REGENERABLE MOLTEN MEDIUM IN THE PRESENCE OF HYDROGEN
3957459 - COAL GASIFICATION ASH REMOVAL SYSTEM
3958957 - METHANE PRODUCTION
3969089 - MANUFACTURE OF COMBUSTIBLE GASES
3975168 - PROCESS FOR GASIFYING CARBONACEOUS SOLIDS AND REMOVING TOXIC CONSTITUENTS FROM AQUEOUS EFFLUENTS
3985519 - HYDROGASIFICATION PROCESS
3993457 - CONCURRENT PRODUCTION OF METHANOL AND SYNTHETIC NATURAL GAS
3998607 - ALKALI METAL CATALYST RECOVERY PROCESS
4007092 - PROCESS FOR PRODUCING LOW SULFUR COKE
4039425 - METHOD FOR PREPARING A COAL SLURRY SUBSTANTIALLY DEPLETED IN MINERAL-RICH PARTICLES
4046523 - SYNTHESIS GAS PRODUCTION
4055484 - ELUTRIATION IN A FLUID COKING PROCESS
4057512 - ALKALI METAL CATALYST RECOVERY SYSTEM
4060478 - COAL LIQUEFACTION BOTTOMS CONVERSION BY COKING AND GASIFICATION
4062760 - DRY FINES RECYCLE IN A COKING PROCESS
4072475 - METHOD FOR IMPROVING GASIFICATION PROCESS RATES AND YIELDS BY MEANS OF ELECTROPHILIC AROMATIC SUBSTITUTION PRETREATMENT OF COAL
4075079 - PROCESS FOR THE PRODUCTION OF HYDROCARBONS FROM COAL
4077778 - PROCESS FOR THE CATALYTIC GASIFICATION OF COAL
4077869 - INTEGRATED COKING AND GASIFICATION PROCESS
4085707 - COMBUSTION OR PART-COMBUSTION IN FLUIDIZED BEDS
4094650 - INTEGRATED CATALYTIC GASIFICATION PROCESS
4113602 - INTEGRATED PROCESS FOR THE PRODUCTION OF HYDROCARBONS FROM COAL OR THE LIKE IN WHICH FINES FROM GASIFIER ARE COKED WITH HEAVY HYDROCARBON OIL
4118204 - PROCESS FOR THE PRODUCTION OF AN INTERMEDIATE BTU GAS

FIRMA CARL STILL RECKLINGHAUSEN
4099929 - METHOD OF REMOVING ASH COMPONENTS FROM HIGH-ASH CONTENT COALS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

FIRMA CARL STILL
4050990 - METHOD AND APPARATUS FOR PRODUCING FORM COKE

FLUOR CORPORATION
3533764 - REACTOR CONTROL SYSTEM
3743488 - SYNTHESIS GAS GENERATION PROCESS
3795485 - SYNTHESIS GAS GENERATION APPARATUS

FMC CORPORATION
3787193 - PRODUCTION OF WATER GAS

FORD, BACON + DAVIS INCORPORATED
3778239 - PRODUCTION OF GASEOUS AND LIQUID FUEL FROM CRUDE OIL

FOREST FUELS, INC.
4095958 - APPARATUS AND METHOD FOR PRODUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

FOSTER WHEELER ENERGY CORPORATION
3979188 - PARTIAL OXIDATION CARBON REMOVAL PROCESS
3980451 - GASIFICATION PROCESS
3998608 - PRODUCTION OF HOT CLEAN INDUSTRIALLY USABLE GAS
4066738 - PROCESS FOR PRODUCING A FUEL GAS AND SULFUR FROM A HYDROCARBON FUEL
4082519 - PROCESS FOR THE GASIFICATION OF COAL

FUJIMI KENMAZAI KOGYO CO., LTD.
4101449 - CATALYST AND ITS METHOD OF PREPARATION

GAS COUNCIL
3420642 - PRODUCTION OF GASES CONTAINING METHANE FROM HYDROCARBONS
3433609 - PROCESS FOR THE PRODUCTION OF GASES CONTAINING METHANE FROM HYDROCARBONS
3441395 - PRODUCTION OF COMBUSTIBLE GASES
3459520 - PROCESS FOR THE PRODUCTION OF GASES CONTAINING METHANE FROM HYDROCARBONS
3469957 - PROCESS FOR THE PRODUCTION OF COMBUSTIBLE GASES
3484219 - PROCESS AND APPARATUS FOR PERFORMING CHEMICAL REACTIONS
3511624 - PROCESS FOR PREPARING METHANE-CONTAINING GASES
3515527 - CATALYTIC TREATMENT OF HYDROCARBONS
3591356 - PROCESS FOR THE PRODUCTION OF A GAS CONTAINING GASEOUS HYDROCARBONS
3607158 - PROCESS FOR THE HYDROGENATION OF COAL
3625665 - PROCESS FOR THE PRODUCTION OF METHANE CONTAINING GASES
3642460 - PROCESS FOR THE PRODUCTION OF A METHANE-CONTAINING GAS

GENERAL ECOLOGICAL SYSTEMS, INC.
3579320 - PROCESS FOR PRODUCING AND RECOVERING VALUABLE MATERIALS FROM MUNICIPAL WASTE

GENERAL ELECTRIC COMPANY
3541729 - COMPACT REACTOR-BOILER COMBINATION
3811849 - REFRACTORY BODIES AS FIXED BED COAL GASIFICATION DILUENTS
3812620 - APPARATUS AND PROCESS FOR SEGREGATING AND DECOMPOSING HETEROGENEOUS WASTE MATERIALS
4070161 - DOUBLE SEAL GATE VALVE STRUCTURE
4101294 - PRODUCTION OF HOT, SATURATED FUEL GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

GILBERT ASSOCIATES, INC.
3854896 - METHOD OF CONVERTING COAL TO PIPELINE QUALITY GAS
4067700 - METHOD FOR GASIFYING COAL

GIRDLER CORPORATION
3442632 - PROCESSES OF PRODUCING FUEL GASES BY REFORMING LIQUID HYDROCARBONS
3477832 - PROCESS FOR THE CATALYTIC STEAM REFORMING OF NAPHTHA AND RELATED

GULF OIL CORPORATION
3971635 - COAL GASIFIER HAVING AN ELUTRIATED FEED STREAM
3971636 - CONDENSATE SCRUBBING OF COAL GASIFIER PRODUCT
3971637 - COAL GASIFICATION PROCESS UTILIZING WASTE WATER FROM AN EXTERNAL PROCESS
3971638 - COAL GASIFICATION PROCESS UTILIZING HIGH SULFUR CARBONACEOUS MATERIAL
3971639 - FLUID BED COAL GASIFICATION

GULF RESEARCH + DEVELOPMENT COMPANY
3732085 - THERMALLY EFFICIENT NONPOLLUTING SYSTEM FOR PRODUCTION OF SUBSTITUTE NATURAL GAS

HALDOR TOPSOE A/S
3926583 - PROCESS FOR THE CATALYTIC STEAM REFORMING OF HYDROCARBONS
4130575 - PROCESS FOR PREPARING METHANE RICH GASES

HEINRICH KOOPERS GMBH
3873845 - METHOD OF PRODUCING ELECTRIC ENERGY INCLUDING COAL GASIFICATION

HERCULES INCORPORATED
3736111 - PROCESS AND APPARATUS FOR THE COMPLETE RECLAMATION OF VALUABLE PRODUCTS FROM SOLID WASTE

HITACHI, LTD.
4060498 - PROCESS FOR STEAM REFORMING OF HYDROCARBONS

HOLTER; HEINZ
4123502 - PROCESS FOR THE PURIFICATION OF GAS GENERATED IN THE PRESSURE GASIFICATION OF COAL

HORIZONS INCORPORATED, A DIVISION OF HORIZONS RESEARCH INCOR
4074980 - PROCESS FOR PRODUCTION OF CARBON MONOXIDE AND HYDROGEN

HUTTENWERK OBERHAUSEN AG., FIRMA
3506590 - MANUFACTURE OF SYNTHESIS-, HYDROGENATING-, OR REDUCTION-GAS
3536455 - PLANT FOR THE PRODUCTION OF METALLURIGICAL REDUCING GAS

HYDROCARBON RESEARCH INC.
3617465 - COAL HYDROGENATION
3769198 - HYDROGENATION OF COAL USING UNREDUCED CATALYST
3775071 - METHOD FOR FEEDING DRY COAL TO SUPERATOMOSPHERIC PRESSURE
3857685 - SYNTHETIC NATURAL GAS PRODUCTION USING A PLUG-FLOW REACTOR
3953180 - PRODUCTION OF LOW BTU SULFUR-FREE GAS FROM RESIDUAL OIL
3996335 - DESULFURIZATION OF FUEL GAS AT HIGH TEMPERATURE USING SUPPORTED MOLTEN METAL CARBONATE ABSORBENT
4099933 - PROCESS FOR THE MULTIPLE ZONE GASIFICATION OF COAL

IDEMITSU KOSAN COMPANY LIMITED
4089798 - PROCESS FOR PRODUCING REDUCING GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

IMPERIAL CHEMICAL INDUSTRIES LIMITED
3421871 - STEAM REFORMING OF HYDROCARBONS
3432443 - CATALYST FOR STEAM REFORMING OF HYDROCARBONS
3507811 - CATALYST FOR THE REACTION OF HYDROCARBONS WITH STEAM
3650713 - STEAM REFORMING OF HYDROCARBONS
3926584 - CATALYST AND CATALYTIC PROCESS
3975169 - PROCESS FOR PRODUCING A NATURAL GAS SUBSTITUTE
4028067 - PROCESS FOR PRODUCING COMBUSTIBLE GASES
4072625 - STEAM-HYDROCARBON PROCESS

IN SITU TECHNOLOGY, INC.
4010800 - PRODUCING THIN SEAMS OF COAL IN SITU

INSTITUTE OF GAS TECHNOLOGY
3421868 - FREE FALL SHALE HYDROGASIFICATION
3433610 - STEAM-REFORMING OF HYDROCARBONS FOR PRODUCTION OF HIGH METHANE CONTENT GAS
3448060 - SUPPORTED SKELETAL NICKEL CATALYST
3488171 - REFORMING AND SELECTIVE METHANATION OF HYDROCARBONS TO GENERATE HYDROGEN
3703052 - PROCESS FOR PRODUCTION OF PIPELINE QUALITY GAS FROM OIL SHALE
3708269 - FOSSIL FUEL HYDROGASIFICATION PROCESS FOR PRODUCTION OF SYNTHETIC PIPELINE GAS
3861885 - CARBON BLACK FUEL PRODUCTION
3867110 - METHOD OF COAL PRETREATMENT
3884649 - COAL PRETREATER AND ASH AGGLOMERATING COAL GASIFIER
3891403 - OIL SHALE HYDROGASIFICATION PROCESS
3891404 - HEAVY OIL HYDROGASIFICATION PROCESS
3935825 - COAL ASH AGGLOMERATION DEVICE
4023280 - VALVE FOR ASH AGGLOMERATION DEVICE
4057402 - COAL PRETREATMENT AND GASIFICATION PROCESS

INTERCONT DEVELOPMENT CORPORATION PTY. LTD.
3996044 - ELECTRO-PYROLYTIC UPRIGHT SHAFT TYPE SOLID REFUSE DISPOSAL AND CONVERSION PROCESS

INTERNATIONAL MATERIALS
3992165 - FUEL REFORMATION SYSTEM

IWATANI AND COMPANY LIMITED
3513044 - METHOD FOR THE PRODUCTION OF A HIGH ENERGY FUEL EMPLOYING ELECTRIC SPARK DISCHARGE

JAPAN GASOLINE CO., LTD
3429680 - STEAM REFORMING OF HYDROCARBONS
3551124 - PROCESS OF GASIFYING HYDROCARBON FRACTIONS CONTAINING SULFUR
3576899 - METHOD FOR MANUFACTURING HIGH PURITY METHANE
3882636 - TWO-STAGE STEAM REFORMING PROCESS OF HYDROCARBONS
3917467 - PROCESS FOR MANUFACTURING HIGH PURITY METHANE GAS
3928002 - LOW-TEMPERATURE STEAM REFORMING PROCESS FOR HYDROCARBONS
3932147 - METHOD OF REFORMING HYDROCARBONS
3992166 - LOW TEMPERATURE STEAM REFORMING PROCESS FOR HYDROCARBONS
4000987 - LOW-TEMPERATURE STEAM REFORMING PROCESS FOR HYDROCARBONS
4000988 - LOW-TEMPERATURE STEAM REFORMING PROCESS FOR HYDROCARBONS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

JOHNSON MATTHEY + CO., LIMITED
3839225 - CATALYST COMPRISING AN INTERMEDIATE COATING OF AN OXIDE OF SCANDIUM, YTTRIUM OR THE LANTHANIOES ANO A PLATINUM/RHOOIUM T OP COATING
3840471 - CATALYST COMPRISING PLATINUM, RHOOIUM AND A BASE METAL

JOHN ZINK COMPANY
3477824 - BURNER AND APPARATUS FOR REFORMING HYDROCARBONS

KABUSHIKI KAISHA TOYOTA CHUO KENKYUSHO
4087259 - PROCESS FOR PARTIALLY OXIDIZING HYDROCARBONS

KAMYR INC.
3950146 - CONTINUOUS PROCESS FOR ENERGY CONSERVING COOPERATIVE COAL FEEDING ANO ASH REMOVAL OF CONTINUOUS, PRESSURIZED COAL GASIFI ERS ANO THE LIKE, ANO APPARATUS FOR CARRYING OUT THE SAME
3950147 - PROCESS FOR FEEDING COAL TO A FLUIDIZED BED OR SUSPENDEO PARTICLE PRESSURIZED PROCESSING CHAMBER ANO APPARATUS FOR CARRY ING OUT THE SAME
4017270 - COAL GASIFICATION PROCESS WITH IMPROVEO PROCEOURES FOR CONTINUOUSLY FEEDING LUMP COAL UNOER PRESSURE
4073629 - COAL GASIFICATION PROCESS WITH IMPROVED PROCEOURE FOR CONTINUOUSLY OISCHARGING ASH PARTICLES ANO APPARATUS THEREFOR
4125384 - METHOD AND APPARATUS FOR CONTINUOUSLY FEEDING SOLIO PARTICLES INTO A PRESSURIZEO CONTAINER

KELLER CORPORATION
4097217 - METHOD FOR CONVERTING COMBUSTOR FROM HYOROCARBONACEOUS FUEL TO CARBONACEOUS FUEL

KERNFORSCHUNGSANLAGE JULICH GMBH
3558047 - ENERGY CONVERSION METHOD

KINGSFORO COMPANY
3852048 - PROCESS FOR PRODUCING INDUSTRIAL FUEL FROM WASTE WOOOY MATERIALS

KOPPELMAN; EDWARD
4069107 - CONTINUOUS THERMAL REACTOR SYSTEM AND METHOO
4106999 - CONTINUOUS THERMAL REACTOR
4126519 - APPARATUS ANO METHOO FOR THERMAL TREATMENT OF ORGANIC CARBONACEOUS MATERIAL

KOPPERS COMPANY INC.
3963457 - COAL GASIFICATION PROCESS
4064222 - NITROGEN FIXATION ANO MOLECULAR MAGNETO HYDROOYNAMIC GENERATION USING A COAL GASIFICATION GAS STREAM

KRUPP KOPPERS GMBH
3954424 - PROCESS FOR PROOUCING A METHANE-CONTAINING GAS ANO ARRANGEMENT THEREFOR
3958956 - METHANE PROOUCTION PROCESS ANO ARRANGEMENT THEREFOR
3973923 - PROCESSES FOR THE PRODUCTION OF METHANE-CONTAINING GASES
4017269 - METHOO ANO ARRANGEMENT FOR GASIFYING FINELY DIVIOED FLUIOIZEO SOLIO COMBUSTIBLE MATERIAL

LACLEOE GAS COMPANY
3477833 - PROCESS FOR THE PROOUCTION OF A NATURAL GAS SUBSTITUTE

LA SOCIETE CHIMIQUE DE LA GRANOE PAROISSE, AZOTE -
3420643 - METHOD FOR REFORMING LIGHT PETROL FRACTIONS UNDER PRESSURE
3457192 - NI ON SILICA-MAGNESIA-ZIRCONIA CATALYTIC COMPOSITIONS USED IN REFORMING WITH STEAM
3533766 - PROCESS FOR REFORMING HYDROCARBONS UNDER HIGH PRESSURE
3533963 - CATALYTIC COMPOSITIONS USED IN STEAM REFORMING ANO METHOOS FOR THEIR PROOUCTION

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

LA SOCIETE OITE SOCIETE CHIMIQUE OE LA GRANOE
3644100 - APPARATUS FOR REFORMING HEAVY HYDROCARBONS

LEAS BROTHERS OEVELOPMENT CORPORATION
3753671 - PROOUCTION OF SYNTHETIC NATURAL GAS ANO HYOROGEN FROM THE GASIFICATION OF CARBONACEOUS MATERIALS
3769197 - POLLUTION-FREE FUELS
3779893 - PROOUCTION OF DESULFURIZEO LIQUIOS ANO GASES FROM COAL
3801288 - GASIFICATION REACTOR
4078989 - COAL CONVERSION PROCESS

LINOE AKTIENGESELLSCHAFT
4019314 - HIGH PRESSURE GASIFICATION OF COAL USING NITROGEN OILUTION OF WASTE GAS FROM STEAM GENERATOR
4091008 - PRODUCTION OF A GAS RICH IN METHANE

LUMMUS COMPANY
3456032 - UTILIZATION OF PROPANE RECOVEREO FROM LIQUEFIED NATURAL GAS
3458298 - WATER GAS PROCESS
3479298 - PROOUCTION OF HYOROGEN
3524819 - STEAM REFORMING OF HYOROCARBONS
3548024 - REGASIFICATION OF LIQUEFIEO NATURAL GAS AT VARYING RATES WITH ETHYLENE RECOVERY

MARATHON OIL COMPANY
3676517 - PROCESS FOR THE PROOUCTION OF SYNTHESIS GAS, CRACKED HYDROCARBON ANO CALCINED COKE
3855336 - PROCESS FOR THE PROOUCTION OF SYNTHESIS GAS, CRACKED HYDROCARBON ANO CALCINED COAL

MARQUAROT COMPANY
4013428 - COAL GASIFICATION PROCESS

MASCHINENFABRIK AUGSBURG-NURNBERG AKTIENGESELLSCHAFT
3912464 - METHOD OF ANO OEVICE FOR SEPARATING SOLIO COMPONENTS FROM A HOT COMBUSTIBLE GAS GENERATED IN A REACTOR

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
4113446 - GASIFICATION PROCESS

MCOOWELL-WELLMAN ENGINEERING COMPANY
3787192 - PROCESS FOR COAL GASIFICATION
3847562 - GAS PROOUCER HAVING ASH REMOVAL PLATES WITH INDIVIOUAL TEMPERATURE SENSING

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3436198 - PROCESS FOR THE MANUFACTURE OF METHANE- RICH GASES
3468641 - CONVERSION OF LIQUIO HYOROCARBONS INTO FUEL GAS OR WATER GAS BY A THERMAL OR CATALYTIC SPLITTING
3540867 - PRODUCTION OF CARBON MONOXIDE ANO HYDROGEN
3726654 - PROCESS FOR GASIFYING HEAVY HYDROCARBONS
3854895 - PROCESS FOR PRODUCING A METHANE-RICH GAS USABLE IN PLACE OF NATURAL GAS
3866353 - PROCESS FOR PROOUCING METHANE-RICH GASES FROM HYDROCARBONS
3898057 - PROCESS FOR CONVERTING METHANOL TO A HIGH-METHANE GAS
3937620 - PROCESS ANO APPARATUS FOR GASIFYING COAL
3963641 - PROCESS FOR INTERRUPTING NORMAL OPERATION OF A HYOROCARBON GASIFICATION REACTOR
3963642 - PROCESS FOR PROOUCING A REDUCING GAS
3979328 - AUTOMATIC CONTROL FOR PROCESS FOR THERMALLY GASIFYING HYDROCARBONS WITH OXYGEN AND WATER VAPOR
3980452 - PROCESS FOR SUPPLYING HEAT TO CHEMICAL REACTIONS
3990867 - PROCESS OF PRODUCING A HIGH-METHANE GAS INTERCHANGEABLE WITH NATURAL GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

METALLGESELLSCHAFT AKTIENGESELLSCHAFT (CDNTINUED)

4012404 - PROCESS FOR PRODUCING HIGH-METHANE GAS
4016189 - PRDCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS
4031030 - PROCESS FOR TREATING RAW GAS PRODUCED BY THE PRESSURE GASIFICATION OF COAL
4033730 - PROCESS AND APPARATUS FDR FEEDING PARTICULATE SOLIDS INTD A PRESSURE REACTOR
4038045 - PROCESS FDR DEGASIFYING FINE-GRAINED FUELS
4056483 - PROCESS FOR PRODUCING SYNTHESIS GASES
4061475 - PROCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS
4065273 - PROCESS FOR BREAKING EMULSIONS IN A TAR-CONTAINING AQUEOUS CONDENSATE
4071332 - PROCESS OF GASIFYING SOLID FUELS, PARTICULARLY COAL
4087258 - PRDCESS FOR PURIFYING RAW GAS FRDM THE GASIFICATION DF SOLID FUELS
4088455 - PROCESS AND APPARATUS FOR A PRESSURE GASIFICATION OF FUELS MAINLY IN LUMP FDRM
4089659 - PROCESS FDR PRODUCING A LEAN GAS BY THE GASIFICATION OF A FUEL MAINLY IN LUMP FDRM
4108634 - PROCESS FOR THERMALLY TREATING FINE-GRAINED SOLIDS
4115079 - REMOVING POLLUTANTS FROM AQUEOUS LIQUOR USED TO SCRUB FUEL GASIFICATION PRODUCT

MIDLAND-ROSS CORPORATION

3617227 - APPARATUS FDR CATALYTIC REFDRMING
3970435 - APPARATUS AND METHOD FOR METHANATIDN

MIFUJI IRON WORKS CD., LTD.

3973924 - PRDCESS FDR CONTINUDUSLY CONVERTING CDAL INTO A SATURATED HYDROCARBON GAS
4049395 - METHOD FOR TREATING RAW MATERIAL WITH A TREATING GAS
4060393 - APPARATUS FOR TREATING RAW MATERIAL WITH A TREATING GAS

MITSUBISHI CHEMICAL INDUSTRIES LTD.

3849087 - PRDCESS FOR PRODUCING GASES BY THE CONVERSION OF HYDRDCARBONS

MITSUBISHI HEAVY INDUSTRIES, LTD.

4052172 - PROCESS FOR GASIFYING COAL OR OTHER CARBON CONTAINING MATERIAL

MITSUBISHI JUKOGYO KABUSHIKI KAISHA

4074979 - THERMAL DECOMPOSITION APPARATUS

MITSUI SHIPBUILDING AND ENGINEERING CO. LTD.

3729297 - APPARATUS FOR CONTINUOUSLY DECOMPOSING HYDROCARBON IN A HEATING MEDIUM BATH
3832151 - PROCESS AND APPARATUS FOR DISPDSAL OF PLASTIC WASTES
3907662 - PROCESS DF PREPARING DESULFURIZED LIGHT OIL AND FUEL GAS FROM HEAVY OIL
3915844 - METHOD FOR TREATMENT OF HEAVY OILS
3941681 - PROCESS FOR CONVERTING INFERIOR HEAVY OIL INTO LIGHT OIL AND GASIFYING THE SAME
3964881 - PROCESS FOR GASIFICATION OF HEAVY HYDROCARBONS

MITSUI TOATSU CHEMICALS INC.

4115074 - GASIFICATION PROCESS

MOBIL OIL CORPORATION

3523772 - STEAM REFORMING OF HYDROCARBONS
3627512 - PREPARATION OF CRACKED GASES
3813330 - PROCESS FOR AROMATIZING OLEFINS IN THE PRESENCE OF EASILY CRACKED PARAFFINS
3827867 - PRODUCTION OF METHANE AND AROMATICS
3983030 - COMBINATION PROCESS FOR RESIDUA DEMETALATION, DESULFURIZATION AND RESULTING COKE GASIFICATION
4046522 - PRE-ENGINE CONVERTER FOR USE WITH FUELS CONTAINING OXYGENATED COMPOUNDS
4070993 - PRE-ENGINE CONVERTER

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

MOBIL OIL CORPORATION (CONTINUED)
4093029 - UTILIZATION OF LOW BTU NATURAL GAS
4098339 - UTILIZATION OF LOW BTU NATURAL GAS
4118201 - PRODUCTION OF LOW SULFUR FUELS FROM COAL
4118281 - CONVERSION OF SOLID WASTES TO FUEL COKE AND GASOLINE/LIGHT OIL

MONTECATINI EDISON S.P.A.
3462250 - PROCESS AND APPARATUS FOR THE PARTIAL COMBUSTION OF LIQUID HYDROCARBONS TO GASEOUS MIXTURES CONTAINING HYDROGEN AND CARB ON MONOXIDE

NIPPON CARBON COMPANY LIMITED
3927986 - APPARATUS FOR INCINERATING A PLASTIC WASTE

NIPPON KOKAN KABUSHIKI KAISHA
3912502 - METHOD OF PREPARING REDUCING GAS
3998606 - METHOD AND APPARATUS FOR MANUFACTURING REDUCING GAS
4005986 - DEVICE FOR MAKING HIGH TEMPERATURE REFORMED GAS

NIPPON SOKEN, INC.
4088608 - CATALYSTS FOR REFORMING HYDROCARBON FUELS

NISSAN MOTOR CO., LTD.
4088450 - HYDROGEN GENERATOR

NORTH AMERICAN UTILITY CONSTRUCTION CORPORATION
3481721 - PROCESS FOR MAKING FUEL GAS

OCCIDENTAL OIL SHALE, INC.
4126180 - METHOD OF ENHANCING YIELD FROM AN IN SITU OIL SHALE RETORT

OCCIDENTAL PETROLEUM CORPORATION
3698882 - CONTINUOUS PROCESS FOR THE CONVERSION OF CARBONACEOUS SOLIDS INTO PIPELINE GAS
3736233 - PROCESS OF PYROLYZING AND DESULFURIZING SULFUR BEARING AGGLOMERATIVE BITUMINOUS COAL
3846096 - GASIFICATION OF CARBONACEOUS SOLIDS
4070250 - PYROLYSIS OF CARBONACEOUS MATERIALS IN A DOUBLE HELIX CYCLONE
4077847 - SOLID WASTE DISPOSAL SYSTEM
4078973 - LOOP PYROLYSIS PROCESS FOR ORGANIC SOLID WASTES
4083751 - CONTINUOUS FEED PYROLYSIS CHAMBER FOR DECOMPOSING SOLID WASTE
4087130 - PROCESS FOR THE GASIFICATION OF COAL IN SITU
4101412 - PROCESS AND APPARATUS FOR RAPID PYROLYSIS OF CARBONACEOUS MATERIALS
4102773 - PYROLYSIS WITH CYCLONE BURNER
4105502 - SIMPLIFIED LIQUEFACTION PYROLYSIS PROCESS AND APPARATUS THEREFOR

OFFICE NATIONAL INDUSTRIAL DE L AZOTE
3467506 - CATALYTIC CONVERSION OF LIQUID PETROLEUM HYDROCARBONS

OSAKA GAS KABUSHIKI KAISHA
3954599 - PROCESS FOR PRODUCING CRACKED GAS AND CRACKED OIL FROM HEAVY HYDROCARBONS
4066421 - PROCESS FOR PRODUCING HIGH CALORIFIC VALUE FUEL GAS

OTTO CONSTRUCTION CORPORATION
3427253 - METHOD FOR PRODUCING CARBON MONOXIDE AND HYDROGEN FROM COAL DISTILLATION GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PARAHO CORPORATION
4092128 - DESULFURIZED GAS PRODUCTION FROM VERTICAL KILN PYROLYSIS

PARSONS, RALPH M., COMPANY
3938968 - PROCESS FOR THE PRODUCTION OF SUBSTITUTE NATURAL GAS

PETROCARBON DEVELOPMENTS LIMITED
3989478 - PRODUCING GASEOUS FUELS OF HIGH CALORIFIC VALUE

PHILLIPS PETROLEUM COMPANY
3484221 - HIGH ENERGY FUEL AND METHOD FOR RECOVERING SAME
3506417 - HYDROCARBON REFORMING
3506418 - HYDROCARBON STEAM REFORMING
3522024 - HYDROCARBON REFORMING
3586621 - HYDROCARBON STEAM REFORMING, CONVERSION AND REFINING
3600145 - PRODUCTION OF METHANE FROM CARBON MONOXIDE AND STEAM
3844734 - CONVERSION OF HYDROCARBON OIL TO A SYNTHETIC NATURAL GAS
3929430 - PROCESS FOR MAKING SYNTHETIC FUEL GAS FROM CRUDE OIL
3988334 - METHOD FOR METHANATION
4003343 - METHOD AND APPARATUS FOR MAINTAINING THE OPERATING TEMPERATURE IN A DEVICE FOR REDUCING ENGINE EXHAUST POLLUTANTS
4011058 - PRODUCTION OF SUBSTITUTE NATURAL GAS FROM GASIFICATION OF COAL CHAR
4070160 - GASIFICATION PROCESS WITH ZINC CONDENSATION ON THE CARBON SOURCE
4071331 - PROCESS FOR PRODUCING METHANE FROM CARBON MONOXIDE AND STEAM
4073630 - PRODUCTION OF CARBON MONOXIDE
4112058 - PRODUCTION OF CARBON MONOXIDE FROM CARBONACEOUS MATERIAL AND ZINC OXIDE
4115524 - PRODUCTION OF CARBON MONOXIDE

PRODUITS CHIMIQUES PECHINEY-SAINT-GOBAIN-
3840356 - CATALYST AND PROCESS FOR STEAM REFORMING OF HYDROCARBONS

PULLMAN, INCORPORATED
3476536 - HYDROGEN PRODUCTION
3519396 - MEANS FOR INJECTING A GASEOUS REACTANT
3567411 - PROCESS FOR THE PRODUCTION OF GASEOUS PRODUCT CONTAINING HYDROGEN AND METHANE
3567412 - GASIFICATION OF CARBONACEOUS FUELS
3771261 - PROCESS FOR MAKING FUEL GAS
3828474 - PROCESS FOR PRODUCING HIGH STRENGTH REDUCING GAS
3862899 - PROCESS FOR THE PRODUCTION OF SYNTHESIS GAS AND CLEAN FUELS
4026823 - HYDROCARBON REFORMING CATALYST AND METHOD FOR PREPARING SAME
4079017 - PARALLEL STEAM REFORMERS TO PROVIDE LOW ENERGY PROCESS

RALPH M. PARSONS COMPANY
3999961 - SULFUR CONTROL OVER CARBON FORMATION IN HIGH TEMPERATURE REFORMING OPERATIONS
4050908 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM COAL
4115075 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM CARBONACEOUS MATERIALS

REINISCHE BRAUNKOHLENWERKE A.G.
3751214 - METHOD OF AND APPARATUS FOR CONVEYING GRANULAR MASSES IN TUBULAR TREATING CHAMBERS
3761233 - METHOD OF GASIFYING WATER CONTAINING COAL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

RHEINISCHE BRAUNKOHLENWERKE AG
3647379 - METHOD OF GASIFYING WATER-CONTAINING COAL

RIO TINTO (RHODESIA) LIMITED
4076612 - PROCESS FOR OBTAINING LIQUID FUEL-OIL AND/OR GASEOUS HYDROCARBONS FROM SOLID CARBONACEOUS FEED STOCKS

ROCKWELL INTERNATIONAL CORPORATION
3708270 - PYROLYSIS METHOD
3745109 - HYDROCARBON CONVERSION PROCESS
3916617 - PROCESS FOR PRODUCTION OF LOW BTU GAS
4017271 - PROCESS FOR PRODUCTION OF SYNTHESIS GAS

RUHRCHEMIE AG
3578423 - PROCESS FOR CATALYTICALLY SPLITTING ISOBUTYRALDEHYDE TO PRODUCE CARBON MONOXIDE AND HYDROGEN

RUHRGAS AKTIENGESELLSCHAFT
4082520 - PROCESS OF PRODUCING GASES HAVING A HIGH CALORIFIC VALUE

SELAS CORPORATION OF AMERICA
3573012 - METHOD FOR STRAIGHT-THROUGH CRACKING OF HYDROCARBONS
3607153 - QUENCH ARRANGEMENT

SERVICE NATIONAL DIT GAZ DE FRANCE
3556750 - PROCESS FOR THE MANUFACTURE UNDER PRESSURE OF GASES WHICH MAY BE SUBSTITUTED FOR NATURAL GASES

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
4054424 - PROCESS FOR QUENCHING PRODUCT GAS OF SLAGGING COAL GASIFIER
4060397 - TWO STAGE PARTIAL COMBUSTION PROCESS FOR SOLID CARBONACEOUS FUELS

SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ B.V.
3994701 - METHOD AND APPARATUS FOR FEEDING COMMINUTED SOLID FUEL INTO PLENUM CHAMBERS
3994702 - METHOD OF DISCHARGING RESIDUES FROM A PRESSURIZED GASIFICATION CHAMBER

SHELL OIL COMPANY
3446609 - GASIFICATION WITH WATER-CONTAINING FEED
3868331 - PROCESS FOR THE PARTIAL COMBUSTION OF HYDROCARBONACEOUS FUELS TO PRODUCE SUBSTANTIALLY SOOT-FREE GASES
3904388 - PROCESS FOR THE PRODUCTION OF A HIGH METHANE CONTENT TOWN GAS
3917468 - SYNTHETIC NATURAL GAS PRODUCTION
3964882 - PARTIAL COMBUSTION PROCESS
3972690 - GASIFICATION PROCESS
3996256 - METHANATION CATALYST
4094813 - PROCESS AND APPARATUS FOR THE MANUFACTURE AND COOLING OF GASES CONTAINING HYDROGEN AND CARBON MONOXIDE

SIEGENER AKTIENGESELLSCHAFT GEISWEID
3658498 - METHOD AND APPARATUS FOR PRODUCING ETHYLENE AND SYNTHESIS GAS BY THERMAL CRACKING

SIEMENS AKTIENGESELLSCHAFT
3871838 - APPARATUS FOR REACTING VAPORIZED, GASIFIED OR ATOMIZED HYDROCARBON WITH A GAS SERVING AS AN OXYGEN CARRIER
3897225 - METHOD AND APPARATUS FOR GENERATING A GAS MIXTURE TO BE FORMED THROUGH CATALYTIC CONVERSION OF FUEL AND A GAS SERVING AS AN OXYGEN CARRIER
3926850 - CATALYST AND PROCESS FOR THE CONVERSION OF HIGHER HYDROCARBONS
3984210 - CATALYST FOR THE CONVERSION OF HYDROCARBONS AND A METHOD OF GENERATING A FUEL GAS USING THE CATALYST
3993459 - CATALYST FOR THE CONVERSION OF HIGHER HYDROCARBONS AND METHOD OF GENERATING A FUEL

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

SNAM PROGETTI S.P.A.
3813229 - PROCESS FOR THE PRODUCTION OF A REDUCING GAS FOR BLAST FURNACE

SOCIETE ANONYME ACTIVIT
3677727 - PROCESS OF ACTIVATION ANO GASIFICATION OF FLUIOISEO CARBONACEOUS MATERIALS

SOCIETE BELGE DE L AZOTE ET OES PROOUITS CHIMIQUES -
3624176 - CATALYTIC PROCESS FOR PROOUCING GAS MIXTURES HAVING HIGH ETHYLENE CONTENTS
3644557 - CATALYST COMPOSITIONS FOR PREPARING ETHYLENE

SOCIETE CHIMIQUE OE LA GRANOE PAROISSE,
3737291 - PROCESS FOR REFORMING HEAVY HYOROCARBONS

STAMICARBON N.V.
3687866 - PROCESS OF PREPARING SYNTHESIS GAS

STEAG AKTIENGESELLSCHAFT
4036606 - METHOO OF CLEANING GASES AND APPARATUS THEREFOR

STORA KOPPARBERGS BERGSLAGS AB
4026679 - APPARATUS FOR ANO PROCESS OF CONVERTING CARBONACEOUS MATERIALS CONTAINING SULPHUR TO AN ESSENTIALLY SULPHUR-FREE COMBUST IBLE GAS

SUMITOMO CHEMICAL COMPANY LIMITEO
4077530 - METHOO FOR CATALYST CHARGING TO TUBULAR REACTOR

SUMITOMO ELECTRIC INOUSTRIES, LTO.
3984288 - METHOO FOR TREATMENT OF RUBBER ANO PLASTIC WASTES

SUN OIL COMPANY OF PENNSYLVANIA
3480416 - GAS PREPARATION PROCESS ANO APPARATUS
3481720 - PROCESS ANO APPARATUS FOR THE DISTILLATION OF SOLIOS
3691063 - RESIDUAL FUEL OIL HYOROCRACKING PROCESS

SUN RESEARCH ANO OEVELOPMENT COMPANY
3770399 - COAL GASIFICATION PROCESS

SYNGAS RECYCLING CORPORATION
4005994 - PROCESS ANO APPARATUS FOR CONVERTING SOLIO WASTES TO PIPELINE GAS

TEXACO OEVELOPMENT CORPORATION
3551347 - OXIDATION PROCESS WITH IMPROVED WASTE HEAT BOILER
3565588 - GAS GENERATOR AND WASTE HEAT BOILER INTERCONNECTED SYSTEM
3620699 - REDUCING GAS GENERATION
3671209 - GARBAGE OISPOSAL PROCESS
3705108 - SYNTHESIS GAS GENERATION
3738940 - METHOO OF OPERATING A BURNER FOR THE PARTIAL OXIDATION OF HYOROCARBONS TO SYNTHESIS GAS
3743606 - SYNTHESIS GAS GENERATION
3816332 - SYNTHESIS GAS PROOUCTION
3847564 - APPARATUS AND PROCESS FOR BURNING LIQUIO HYOROCARBONS IN A SYNTHESIS GAS GENERATOR
3922148 - PRODUCTION OF METHANE-RICH GAS
3945942 - FUEL BURNER ANO PROCESS FOR GAS MANUFACTURE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO DEVELOPMENT CORPORATION (CONTINUED)

3980590 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980591 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980592 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4081253 - PRODUCTION OF PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE
4099932 - CONVERSION OF SOLID FUELS TO FLUID FUELS
4113445 - PROCESS FOR THE PARTIAL OXIDATION OF LIQUID HYDROCARBONACEOUS FUELS

TEXACO INC.

3473903 - RECOVERY OF CARBON FROM SYNTHESIS GAS
3485882 - STEAM-HYDROCARBON PROCESS OVER IRON-CHROMIUM CATALYST FOR SYNTHESIS GAS PRODUCTION
3528930 - PRODUCTION OF SYNTHESIS GAS
3531265 - SYNTHESIS GAS PURIFICATION
3544291 - COAL GASIFICATION PROCESS
3545926 - PRODUCTION OF SYNTHESIS GAS AND HYDROGEN
3556751 - PRODUCTION OF SYNTHESIS GAS
3574578 - STEAM HYDROCARBON REFORMING PROCESS
3607156 - HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS
3607157 - SYNTHESIS GAS FROM PETROLEUM COKE
3615297 - CARBON RECOVERY PROCESS
3620698 - HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS
3620700 - RECOVERY OF ENTRAINED CARBON IN SYNTHESIS GAS
3639261 - PROCESS FOR THE GENERATION OF SYNTHESIS GAS FROM OIL
3660046 - QUENCHING APPARATUS FOR A HIGH PRESSURE SYNTHESIS GAS PROCESS
3666423 - HEAT EXCHANGE APPARATUS
3694373 - PRODUCTION OF REDUCING GAS
3709669 - METHANE PRODUCTION
3715301 - MULTI-HYDROTORTING OF COAL
3725270 - POLLUTION ABATEMENT PROCESS FOR REFINERY WASTE WATER
3740204 - PROCESS FOR THE PRODUCTION OF METHANE FROM CARBONACEOUS FUELS
3759679 - PRODUCTION OF METHANE-RICH FUEL GAS
3764547 - SLURRIES OF SOLID CARBONIFEROUS FUELS
3784364 - PRODUCTION OF FUEL GAS
3796547 - HEAT EXCHANGE APPARATUS FOR CATALYTIC SYSTEM
3840355 - PARTIAL OXIDATION OF HYDROCARBONS TO SYNTHESIS GAS
3846095 - REDUCING GAS GENERATION
3866411 - GAS TURBINE PROCESS UTILIZING PURIFIED FUEL AND RECIRCULATED FLUE GASES
3868817 - GAS TURBINE PROCESS UTILIZING PURIFIED FUEL GAS
3884648 - PROCESS FOR MAKING A REDUCING GAS
3888043 - PRODUCTION OF METHANE
3890113 - PRODUCTION OF METHANE
3917569 - RECOVERY OF CARBON FROM SYNTHESIS GAS
3927997 - METHANE-RICH GAS PROCESS
3927998 - PRODUCTION OF METHANE-RICH GAS STREAM
3927999 - METHANE-RICH GAS PROCESS
3928000 - PRODUCTION OF A CLEAN METHANE-RICH FUEL GAS FROM HIGH-SULFUR CONTAINING HYDROCARBONACEOUS MATERIALS
3928001 - PRODUCTION OF METHANE
3929429 - FUEL GAS FROM SOLID CARBONACEOUS FUELS
3951617 - PRODUCTION OF CLEAN FUEL GAS
3957682 - PREPARATION OF METHANE, HYDROGEN AND CARBON MONOXIDE CONTAINING GASES
3976442 - SYNTHESIS GAS FROM GASEOUS CO/2\ -SOLID CARBONACEOUS FUEL FEEDS
3976443 - SYNTHESIS GAS FROM SOLID CARBONACEOUS FUEL
3996026 - PROCESS FOR FEEDING A HIGH SOLIDS CONTENT SOLID FUEL-WATER SLURRY TO A GASIFIER

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC. (CONTINUEO)
3998609 - SYNTHESIS GAS GENERATION
4006099 - MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYOROGEN ANO CARBON MONOXIOE
4006100 - MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYOROGEN ANO CARBON MONOXIOE
4007018 - PROOUCTION OF CLEAN SYNTHESIS OR FUEL GAS
4007019 - PROOUCTION OF CLEAN SYNTHESIS OR FUEL GAS
4046869 - STEAM REFORMING PROCESS
4065514 - PREPARATION OF METHANE
4074981 - PARTIAL OXIOATION PROCESS
4075831 - PROCESS FOR PROOUCTION OF PURIFIEO ANO HUMIOIFIEO FUEL GAS
4099382 - BY-PROOUCT SUPERHEATEO STEAM FROM THE PARTIAL OXIOATION PROCESS
4099383 - PARTIAL OXIOATION PROCESS
4121912 - PARTIAL OXIDATION PROCESS WITH PROOUCTION OF POWER

TEXAS INSTRUMENTS, INCORPORATEO
3453146 - METHOO ANO APPARATUS FOR REFORMING CARBONACEOUS FUELS ANO OPERATING FUEL CELL
3505018 - REFORMING HYOROCARBON FUELS
3516807 - APPARATUS FOR PROOUCING HYOROGEN GAS BY THE PARTIAL OXIOATION OF A CARBONACEOUS FUEL CONTAINING HYOROGEN
3619144 - APPARATUS FOR REFORMING HYOROCARBON FUELS TO PROOUCE HYOROGEN
3685977 - PARTIAL OXIOATION OF HYOROCARBONS

THAGARO TECHNOLOGY COMPANY
4057396 - FLUIO-WALL REACTOR FOR HIGH TEMPERATURE CHEMICAL REACTION PROCESSES
4059416 - CHEMICAL REACTION PROCESS UTILIZING FLUIO-WALL REACTORS

TOHOKU UNIVERSITY
4005995 - PROCESS FOR PROOUCING A GASEOUS PROOUCT FROM CARBONACEOUS MATERIAL

TOKYO HEAT TREATING COMPANY
3682605 - METHOO ANO APPARATUS FOR SOOT CONTROLLING IN A THERMAL OECOMPOSITION OF A HYOROCARBON GAS

TOPSOE, HALOOR FREOERIK AXEL
3436358 - REFORMING WITH A NICKEL ANO NICKEL OXIOE CATALYST ON A MAGNESIUM ALUMINATE SPINEL CONTAINING SUPPORT

TORRAX SYSTEMS, INC.
3511194 - METHOO ANO APPARATUS FOR HIGH TEMPERATURE WASTE OISPOSAL
3702039 - PROOUCTION OF USABLE PROOUCTS FROM WASTE MATERIAL

TOTAL ENERGY CORPORATION
3692506 - HIGH BTU GAS CONTENT FROM COAL

TOYO-KOGYO CO., LTO.
3582296 - GASIFYING PROCESS
3957681 - PROCESS FOR MANUFACTURING GASEOUS MIXTURES RICH IN HYOROGEN

TOYOTA JIOOSHA KOGYO KABUSHIKI KAISHA
3908606 - INTERNAL COMBUSTION ENGINE
3976034 - METHOO FOR PROOUCING A COMBUSTIBLE GAS BY PARTIAL OXIOATION FOR USE IN INTERNAL COMBUSTION ENGINES
4119061 - METHOO AND EQUIPMENT FOR CONTROL OF INTERNAL COMBUSTION ENGINE INCLUOING A FUEL-REFORMING OEVICE
4125091 - METHOO ANO EQUIPMENT FOR CONTROL OF INTERNAL COMBUSTION ENGINE WITH FUEL-REFORMING OEVICE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TRANSCONTINENTAL GAS PIPELINE CORPORATION, MESNE
3728093 - PRODUCTION OF SYNTHETIC PIPELINE GAS

TRW INC.
4069304 - HYDROGEN PRODUCTION BY CATALYTIC COAL GASIFICATION

UBE INDUSTRIES LTD.
3848016 - PRODUCTION OF CRACKED GASES FROM LIQUID HYDROCARBON

UNDE, FRIEDRICH, G.M.B.H.
3688494 - PROCESS AND APPARATUS FOR HEATING HYDROCARBONS

UNION CARBIDE CORPORATION
3729298 - SOLID REFUSE DISPOSAL PROCESS AND APPARATUS
3985518 - OXYGEN REFUSE CONVERTER
3988236 - PROCESS FOR THE CONTINUOUS HYDROCARBONIZATION OF COAL
3988237 - INTEGRATED COAL HYDROCARBONIZATION AND GASIFICATION OF CHAR
4017273 - PYROLYSIS PROCESS FOR CONVERTING REFUSE TO FUEL GAS
4042345 - PROCESS FOR CONVERSION OF SOLID REFUSE TO FUEL GAS USING PELLETIZED REFUSE FEED
4064156 - METHANATION OF OVERSHIFTED FEED
4124628 - SERIAL ADIABATIC METHANATION AND STEAM REFORMING

UNION OIL COMPANY OF CALIFORNIA
3458299 - HYDROCRACKING PROCESS
4010092 - OIL SHALE RETORTING-GASIFICATION PROCESS
4042532 - THERMALLY STABLE NICKEL-ALUMINA CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS AND METHOD FOR THE MANUFACTURE OF S AID CATALYSTS
4064152 - THERMALLY STABLE NICKEL-ALUMINA CATALYSTS USEFUL FOR METHANATION

UNION RHEINISCHE BRAUNKOHLEN KRAFFSTOFF AKTIENGESELLSCHAFT
3690550 - PROCESS FOR TRANSPORTING THERMAL ENERGY

UNITED ENGINEERING + CONSTRUCTORS INC.
3420641 - MANUFACTURE OF COMBUSTIBLE GAS
3429677 - MANUFACTURE OF GAS RICH IN HYDROGEN AND IN OXIDES OF CARBON
3429678 - PROCESS AND APPARATUS FOR MANUFACTURING GAS RICH IN HYDROGEN AND IN OXIDES OF CARBON

UNITED STATES OF AMERICA, ARMY
3734790 - GASEOUS ILLUMINANT PYROTECHNIC SYSTEMS

UNITED STATES OF AMERICA, ATOMIC ENERGY COMMISSION
3794116 - SITU COAL BED GASIFICATION

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3933447 - UNDERGROUND GASIFICATION OF COAL
3945809 - METHOD AND APPARATUS FOR REMOVING COARSE UNENTRAINED CHAR PARTICLES FROM THE SECOND STAGE OF A TWO-STAGE COAL GASIFIER
3957460 - OXIDATION OF COAL-WATER SLURRY FEED TO HYDROGASIFIER
3967936 - METHANATION PROCESS UTILIZING SPLIT COLD GAS RECYCLE
3970434 - PROCESS FOR REDUCING SULFUR IN COAL CHAR
3981690 - AGGLOMERATING COMBUSTOR-GASIFIER METHOD AND APPARATUS FOR COAL GASIFICATION
3988123 - GASIFICATION OF CARBONACEOUS SOLIDS
3989480 - DECOMPOSITION OF CARBOHYDRATE WASTES
3993458 - METHOD FOR PRODUCING SYNTHETIC FUELS FROM SOLID WASTE

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITEO STATES OF AMERICA, OEPARTMENT DF ENERGY (CONTINUEO)
4018654 - PRETREATMENT OF COAL DURING TRANSPDRT
4078904 - PROCESS FOR FORMING HYDROGEN ANO OTHER FUELS UTILIZING MAGMA

UNITEO STATES OF AMERICA, DEPARTMENT OF STATE
3989734 - SLURRY PHASE METHANATION PROCESS

UNITED STATES OF AMERICA, ENVIRONMENTAL PROTECTION AGENCY
3966431 - WASTE STDNE OXIOATION ANO RECARBONIZATION

UNITEO STATES OF AMERICA, INTERIOR
3424556 - PROOUCTION OF CARBON BLACK FROM COAL
3429679 - PROCESS FOR IMPROVING THE HEATING VALUES OF FUEL GASES
3463623 - PROCESS FOR GASIFYING CAKING COALS
3477942 - HYOROCARBON FUELS FROM COAL OR ANY CARBONACEOUS MATERIAL
3516808 - PREPARATION DF CARBON DIOXIDE ACCEPTORS BY THE MELT PROCESS
3551123 - SYSTEM EMPLOYING COAL AS FUEL IN A STEAM REFORMER
3556978 - HYOROGASIFICATION OF CARBONACEOUS MATERIAL
3565593 - CONVERGING-DIVERGING TYPE GAS-SOLIOS FLUIDIZER ANO METHOO OF USE
3640846 - PROOUCTION OF METHANE BY BACTERIAL ACTIDN
3733187 - PROCESS FOR CONVERTING SOLID WASTES TD PIPELINE GAS
3733255 - CONVERSION OF MUNICIPAL REFUSE, SEWAGE SLUDGE ANO OTHER WASTES TO HEAVY OIL OR BITUMEN
3746522 - GASIFICATION OF CARBONACEOUS SOLIOS
3782913 - TWO-STAGE GASIFICATION OF COAL WITH FORCED REACTANT MIXING ANO STEAM TREATMENT OF RECYCLEO CHAR
3817723 - TWO-STAGE GASIFICATION OF PRETREATED COAL
3840354 - THREE-STAGE GASIFICATION OF COAL
3844733 - TWO-STAGE ODWNFLOW GASIFICATION OF COAL
3904386 - COMBINEO SHIFT ANO METHANATION REACTION PROCESS FOR THE GASIFICATION OF CARBONACEOUS MATERIALS

UNITEO STATES OF AMERICA, NATIONAL AERONAUTICS ANO SPACE ADM
3971847 - HYORDGEN-RICH GAS GENERATDR
3982910 - HYOROGEN-RICH GAS GENERATOR

UNITEO TECHNOLOGIES CORPORATION
3446594 - METHOD FOR GENERATING HYDROGEN-CONTAINING FEEDSTOCKS
3476534 - HYOROGEN GENERATOR INCLUDING OESULFURIZATION WITH LOW PRESSURE HYOROGEN FEEOBACK
3476535 - HYDROGEN GENERATOR INCLUOING DESULFURIZATION WITH DIFFUSEO HYOROGEN FEEOBACK
3480417 - HYDROGEN GENERATOR INCLUDING A OESULFURIZER EMPLOYING A FEEOBACK EJECTOR
3522019 - APPARATUS FDR GENERATING HYOROGEN FROM LIQUID HYOROGEN-CONTAINING FEEOSTOCKS
3531263 - INTEGRATEO REFDRMER UNIT
3635682 - FUEL CELL REACTOR-BURNER ASSEMBLY
3962411 - METHOO FOR CATALYTICALLY CRACKING A HYOROCARBON FUEL
4071330 - STEAM REFORMING PROCESS ANO APPARATUS THEREFOR

UNIVERSITY OF CALIFORNIA, THE REGENTS OF
3639111 - METHOO ANO APPARATUS FOR PREVENTING FORMATION OF ATMOSPHERIC POLLUTANTS IN THE COMBUSTION OF ORGANIC MATERIAL
3718446 - POLLUTANT-FREE PROCESS FOR PROOUCING A CLEAN BURNING FUEL GAS FROM ORGANIC-CONTAINING WASTE MATERIALS
3761568 - METHOO AND APPARATUS FOR THE OESTRUCTIVE DECOMPOSITION OF ORGANIC WASTES WITHOUT AIR POLLUTION ANO WITH RECOVERY OF CHEMICAL BYPROOUCTS

UNIVERSITY OF ILLINOIS FOUNOATION
4004896 - PROOUCTION OF WATER GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNIVERSITY OF WYOMING
3505204 - DIRECT CONVERSION OF CARBONACEOUS MATERIAL TO HYDROCARBONS

UOP INC.
3524820 - PREPARATION OF RARE EARTH METAL EXCHANGED CRYSTALLINE ALUMINO SILICATES
3744981 - STEAM REFORMING OF HYDROCARBONS
3825487 - METHOD FOR SIMULTANEOUSLY PRODUCING SYNTHETIC NATURAL GAS AND HIGH OCTANE REFORMATE
3837822 - TWO-STAGE COUNTERCURRENT FLUID-SOLID CONTACTING PROCESS
3882015 - COUNTERCURRENT CATALYTIC CONTACT OF A REACTANT STREAM IN A MULTI-STAGE PROCESS AND THE APPARATUS THEREFOR
3918930 - COUNTERCURRENT CATALYTIC CONTACT OF A REACTANT STREAM IN A MULTIPLE-STAGE PROCESS AND THE APPARATUS THEREFOR
3940190 - HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE
3948762 - HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE
4010008 - SUBSTITUTED NATURAL GAS VIA HYDROCARBON STEAM REFORMING

URBAN RESEARCH DEVELOPMENT CORPORATION
3926582 - METHOD AND APPARATUS FOR PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS

VOLKSWAGENWERK AKTIENGESELLSCHAFT
4026248 - ARRANGEMENT FOR STABILIZATION OF FLOW IN A REACTION CARBURETOR

WALLACE-ATKINS OIL CORPORATION
4038152 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WASTE MATERIAL

WALLACE ENERGY CONVERSION, INC.
4118282 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF HIGH MOLECULAR WEIGHT ORGANIC MATERIALS

WASHINGTON GAS LIGHT COMPANY
3607154 - REFRACTORY BED FOR GAS MACHINE AND PROCESS FOR PRODUCING OIL GAS

WELLMAN INCANDESCENT FURNACE COMPANY LIMITED
3527586 - PRODUCTION OF FUEL GAS

WESTINGHOUSE ELECTRIC CORP.
3554715 - CROSS FLOW ARC HEATER APPARATUS AND PROCESS FOR THE SYNTHESIS OF CARBON, ACETYLENE AND OTHER GASES
3804606 - APPARATUS AND METHOD FOR DESULFURIZING AND COMPLETELY GASIFYING COAL
3847563 - MULTI-STAGE FLUIDIZED BED COAL GASIFICATION APPARATUS AND PROCESS
4021298 - CONVERSION OF COAL INTO HYDROCARBONS

WESTVACO CORPORATION
3843559 - PROCESS FOR MAKING ACTIVATED CARBON FROM AGGLOMERATIVE COAL WITH WATER INJECTION TEMPERATURE CONTROL IN A FLUIDIZED OXID ATION STAGE
3951856 - PROCESS FOR MAKING ACTIVATED CARBON FROM AGGLOMERATIVE COAL

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
APPLEBY	VERNON	L.	1720 W. BAYSHORE, NO. 19	PALO ALTO	CA	94303
4019896 - TRASH DISPOSAL SYSTEM						
BANQUY	DAVID	L.	39 RUE ST.-PLACIDE	75006 PARIS		FR
3904389 - PROCESS FOR THE PRODUCTION OF HIGH BTU METHANE-CONTAINING GAS						
BRIMHALL	GEORGE	H.	435 MIRADA ROAD	HALF MOON BAY	CA	94109
4050907 - ORGANIC WASTE TREATING AND CONVERSION SYSTEM						
CAUGHEY	ROBERT	A.	CLINTON ROAD	ANTRIM	NH	03440
4030895 - APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS						
CROUCH	WILLIAM	B.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
DONATH	ERNEST	E.	P.O. BOX 1068	CHRISTIANSTED, ST. C	VI	00820
3991557 - PROCESS FOR CONVERTING HIGH SULFUR COAL TO LOW SULFUR POWER PLANT FUEL						
4094651 - PROCESS FOR PSEUDOHYDROSTATIC FEEDING OF SOLIDS INTO A REACTOR						
ESTABROOK	LAWRENCE	E.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
FLEMING	JOSEPH		15925 MCDERMITT ST.	FOUNTAIN VALLEY	CA	92708
4002438 - ORGANIC CONVERSION SYSTEM						
GIFFORD	PHILLIP	H. JR.	MARBLE STAR ROUTE	CARBONDALE	CO	81623
4001105 - HYDROCRACKING PROCESS FOR THE PRODUCTION OF SYNTHETIC FUELS						
GOLD	LOUIS		2725 - 39TH ST., NORTHWEST	WASHINGTON	DC	20007
3985520 - GASIFICATION PROCESS AND APPARATUS						
GOLD	LOUIS		2725 39TH ST., NW.	WASHINGTON	DC	20007
4004895 - COAL REACTOR						
4078914 - GASIFICATION OF COAL AND REFUSE IN A VERTICAL SHAFT FURNACE						
4080196 - METHOD OF OPERATING A VERTICAL SHAFT FURNACE						
GRYAZNOV	VLADIMIR	MIKHAILOV	LENINSKIE GORY, MGU, ZONA L, K	MOSCOW		SU
3865891 - METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION						
HEGARTY	WILLIAM	P.	31 FAIRWAY LN.	WESCOVILLE	PA	18106
3870481 - METHOD FOR PRODUCTION OF SYNTHETIC NATURAL GAS FROM CRUDE OIL						
HREHA	FRANK		SUN VALLEY DRIVE	CROTON FALLS	NY	10518
4009006 - WATER TO FUEL CONVERTER						
KIENER	KARL		7081 GOLDSHOFE	OSTALBKREIS		DT
4028068 - PROCESS AND APPARATUS FOR THE PRODUCTION OF COMBUSTIBLE GAS						
KUNII	DAIZO		1-25-16 NAKAMACHI	MEGURO, TOKYO		JA
3912465 - CONTINUOUS CARBONIZATION AND GASIFICATION OF PARTICULATE COAL WITH DOUBLE RECIRCULATION OF FLUIDIZED PARTICULATE HEAT CARRIER						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
KUNII	DAIZO		1-25-16	NAKAMACHI, MEGURO, T		JA
3989481 - CONTINUOUS CATALYTIC GASIFICATION OF HEAVY HYDROCARBON OILS WITH RECIRCULATED FLUIDIZED CATALYST						
KUNUGI	TAISEKI		7-17-22-903 ROPPONGI	MINATO, TOKYO		JA
3912465 - CONTINUOUS CARBONIZATION AND GASIFICATION OF PARTICULATE COAL WITH DOUBLE RECIRCULATION OF FLUIDIZED PARTICULATE HEAT CARRIER						
KUNUGI	TAISEKI		7-17-22-903	ROPPONGI, MINATO, TO		JA
3989481 - CONTINUOUS CATALYTIC GASIFICATION OF HEAVY HYDROCARBON OILS WITH RECIRCULATED FLUIDIZED CATALYST						
LEBEDEVA	VALENTINA	IVANOVNA	LENINSKY PROSPEKT, 48A, KV. 29	MOSCOW		SU
3865891 - METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION						
MALEK	JOHN	MICHAEL	P.O. BOX 2870	PASADENA	CA	91105
4057484 - PROCESS FOR HYDROLIQUEFYING COAL OR LIKE CARBONACEOUS SOLID MATERIALS						
MICHAELS-CHRISTOPHERVAN			1817= N. LAS PALMAS AVE.	HOLLYWOOD	CA	90028
4110082 - REFORMED HYDROCARBONS AND ALCOHOLS FROM FUEL ALLOYS AND REFORMING AGENTS						
MISCHENKO	ALEXANDR	PETROVICH	KHERSONSKAYA ULITSA, 7, KORPUS	MOSCOW		SU
3865891 - METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION						
POLYAKOVA	VICTORIA	PETROVNA	ULITSA TROFIMOVA, 15, KV. 201	MOSCOW		SU
3865891 - METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION						
RICHTER	GEORGE	N.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
SAVITSKY	EVGENY	MIKHAILOV	ULITSA DM. ULYANOVA, DNR-3, KV	MOSCOW		SU
3865891 - METHOD OF DEHYDROGENATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION						
SCHREIBER	EDWARD	T.	7400 LYNDALE AVE. SOUTH	MINNEAPOLIS	MN	55423
3978821 - ENERGY PRODUCER USING DUAL FUELS						
SCHROEDER	WILBURN	C.	7316 RADCLIFFE DRIVE	COLLEGE PARK	MD	20740
3944480 - PRODUCTION OF OIL AND HIGH BTU GAS FROM COAL						
SCHUHMANN	REINHARDT	JR.	1206 HAYES ST.	WEST LAFAYETTE	IN	47906
4095960 - APPARATUS AND METHOD FOR THE GASIFICATION OF SOLID CARBONACEOUS MATERIAL						
SINGH	ALAMJIT	D.	P.O. BOX 1679	CHICAGO	IL	60690
4039392 - PROCESS AND APPARATUS FOR PRODUCING CHAR AND CO-PRODUCTS FROM COAL AND THE LIKE						
SLATER	WILLIAM	L.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
SQUIRES	ARTHUR	M.	245 W. 104 ST.	NEW YORK	NY	10025
3957457 - GASIFYING COAL OR COKE AND DISCHARGING ASH AGGLOMERATES						
3957458 - GASIFYING COAL OR COKE AND DISCHARGING SLAG FRIT						
4032305 - TREATING CARBONACEOUS MATTER WITH HOT STEAM						
VAN SLYKE	WILLIAM	J.	2549 HARRIS AVE.	RICHLAND	WA	99352
3977844 - PROCESS FOR PRODUCING A SULFUR FREE COMBUSTIBLE GAS						
VESTAL	GEORGE	W.	RT. 4, BOX 238	DENTON	TX	76201
3870611 - PROCESSING OF COAL TO PRODUCE LIQUID AND VAPOROUS HYDROCARBONS						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3424695 - IMPROVING REFORMER-FURNACE PERFORMANCE BY USING GAS-TURBINE EXHAUST
3436314 - TECHNIQUE FOR CONVERTING BAGASSE AND OTHER MOIST PLANT SUBSTANCES INTO CHARCOAL
3437561 - AGGLOMERATING COAL HYDROCARBONIZATION PROCESS
3441393 - PULLMAN INCORPORATED PROCESS FOR THE PRODUCTION OF HYDROGEN-RICH GAS
3441394 - MAKING STEAM FOR GASIFYING COAL
3451949 - CATALYST FOR REFORMING HYDROCARBONS
3469944 - PROCESS AND APPARATUS FOR THE MANUFACTURE OF HYDROGEN
3471275 - METHOD OF DISPOSAL OF REFUSE
3481834 - PROCESS AND APPARATUS FOR DESULFURIZING FUELS
3493344 - REVOLVING PEBBLE BED HEAT EXCHANGER
3497335 - UNDERGROUND GASIFICATION OF COAL
3515514 - PRODUCTION OF HYDROGEN CONTAINING GASES
3556749 - GENERAL ELECTRIC COMPANY APPARATUS AND METHOD FOR THE HYOROGENATION OF COAL
3597327 - PROCESS FOR PYROLYZING A SOLID OR LIQUID HYOROCARBONACEOUS FUEL IN A FLUIDIZED BED
3625664 - PROCESS FOR THE PRODUCTION OF RICH FUEL TO REPLACE NATURAL GAS BY MEANS OF CATALYTIC HYDROGASIFICATION UNOER P RESSURE OF FLUID HYDROCARBONS
3649230 - OIL VAPORIZER
3668120 - TREATMENT OF ORGANIC WASTE PRODUCTS
3684689 - PROCESS FOR PRODUCING LIGHT PRODUCTS FROM HEAVY HYDROCARBONS
3687646 - SEWAGE DISPOSAL PROCESS
3688438 - PRODUCTION OF A METHANE-RICH SYNTHESIS GAS
3697256 - METHOD OF INCINERATING REFUSE
3715195 - MULTI-HYDROTORTING OF COAL
3734833 - LOW SULPHUR FUEL SYSTEM
3746521 - GASIFICATION METHOD AND APPARATUS
3748280 - NICKEL-CALCIUM ALUMINATE-BARIUM SALT CATALYST
3751228 - APPARATUS FOR REFORMING HYDROCARBONS UNDER PRESSURE
3761359 - METHOD AND APPARATUS FOR HEAT-TREATING MATERIALS
3778240 - COKING PREVENTION SYSTEM
3817726 - PROCESS FOR CRACKING OR STEAM REFORMING HYDROCARBONS USING AN ALKALI POLYALUMINATE CATALYST
3820965 - METHOD OF REDUCING ENVIRONMENTAL POLLUTION BY UTILIZING STACK GASES, RESULTING FROM THE BURNING OF FOSSIL FUEL S, AND WATER, INCLUDING SEA WATER, TO MANUFACTURE HYOROCARBON ENERGY FUEL, POTABLE WATER AND OTHER COMMERCIAL PRODUCTS
3836344 - PROCESS ANO SYSTEM FOR THE PROOUCTION OF SUBSTITUTE PIPELINE GAS
3840353 - PROCESS FOR GASIFYING GRANULATED CARBONACEOUS FUEL
3841851 - PROCESS AND APPARATUS FOR THE GASIFICATION OF ORGANIC MATTER
3853498 - PROOUCTION OF HIGH ENERGY FUEL GAS FROM MUNICIPAL WATES
3945944 - CATALYST FOR THE PROOUCTION OF HYDROGEN AND/OR METHANE
3975913 - GAS GENERATOR AND ENHANCED ENERGY CONVERSION SYSTEMS
4052138 - METHOD OF FIRING COAL BOILER TO PRODUCE SECONDARY FUEL GAS

3072469	3073672	3079325	3086853	3087782	3088816	3090684	3097081	3097082	3097935	3103423	3104956
3104957	3106457	3106521	3107985	3110578	3111400	3115394	3117848	3118746	3119667	3120430	3122493
3124435	3124436	3124529	3124736	3128163	3128164	3130020	3131037	3140154	3141796	3143142	3144312
3145076	3147093	3148140	3148227	3156544	3156657	3159458	3168386	3171369	3173764	3175019	3175890
3178272	3179584	3180902	3186957	3188179	3192018	3192150	3194644	3195874	3195989	3197293	3198748
3201214	3201215	3202603	3203767	3203784	3206394	3210170	3216952	3222132	3222147	3224211	3224849
3226204	3226212	3232727	3232728	3236604	3236615	3244615	3247092	3247192	3248441	3250601	3252773
3252774	3253906	3254976	3257172	3258409	3262886	3264066	3264210	3270078	3271325	3271326	3278268
3278452	3278462	3283749	3285719	3291573	3291581	3291582	3297777	3311460	3312634	3317292	3320182
3322195	3322521	3328477	3329605	3334055	3334971	3337314	3340012	3345307	3346481	3347647	3349029
3350176	3351563	3351566	3352652	3353993	3359215	3362887	3363024	3368982	3371050	3371126	3374052
3375098	3375175	3375288	3377057	3379505	3383228	3384467	3388057	3388074	3390971	3392218	3393964
3394086	3395004	3395104	3396124	3396218	3397962	3398058	3404100	3407149	3407789	3408171	3410661
3414247	3415634	3416904	3417029	3418093	3838536						

II.B. IN VITRO CONVERSION: OBTAINING FUEL GAS
1. PROCESSES

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,132,065	Texaco, Inc.: Production Of H_2 And CO-Containing Gas Stream And Power
4,132,764	Phillips Petroleum Company: Production Of Carbon Monoxide From Carbonaceous Material And Zinc Oxide
4,133,739	Chevron Research Company: Retorting Process
4,133,825	British Gas Corporation: Production Of Substitute Natural Gas
4,134,740	Texaco, Inc.: Method For Energy Utilization In Producing Synthesis Gas And Recovering Unconverted Carbon
4,134,824	Union Carbide Corporation: Integrated Process For the Partial Oxidation-Thermal Cracking Of Crude Oil Feedstocks
4,134,907	Hazen Research, Inc.: Process For Enhancing The Fuel Valve Of Low BTU Gas
4,135,889	University of Utah: Single Stage, Coal Gasification Reactor
4,135,893	Cogas Development Company: Mixing Method And Device
4,135,968	Weyhaeuser Company: Spent Liquor Treatment
4,137,051	General Electric Company: Grate For Coal Gasifier
4,137,053	Chevron Research Company: Gasification Process
4,140,184	Ira C. Bechtold, 1987 Skyline Vista Dr. La Habra, CA 90631, H. Randall Emmerson, 47 Rockview Dr., Irvine, CA 92715: Method For Producing Hydrocarbons From Igneous Sources
4,140,493	Phillips Petroleum Company: Hydrocarbon Steam Reforming Process
4,140,583	Pioneer Corporation: Processing Of Lignite For Petrochemicals
4,141,695	Texaco, Inc.: Process For Gas Cleaning With Reclaimed Water
4,141,696	Texaco, Inc.: Process For Gas Cleaning With Reclaimed Water And Apparatus For Water Reclamation

4,141,794 Occidental Petroleum Corporation: Grid-Wall Pyrolysis Reactor

4,145,274 Occidental Petroleum Corporation: Pyrolysis With Staged Recovery

4,146,359 Occidental Petroleum Corporation: Method For Reacting Nongaseous Material With A Gaseous Reactant

4,146,369 Projektierung Chemische Verfahren Stechnik GmbH, Fed. Rep. Of Germany: Process For Gas Production From Solid Fuels

4,146,370 Shell Internationale Research Maatschappij B.V.: Process And Apparatus For The Partial Combustion of Coal Powder

4,147,593 Occidental Petroleum Corporation: Flash Pyrolysis Of Organic Solid Waste Employing Ash Recycle

4,147,660 Osaka Gas Company, Ltd: Method For Reactivation Of Platinum Group Metal Catalyst With Aqueous Alkaline And/Or Reducing Solutions

4,149,856 Willy Keller, Hettlingerstrasse 7,8472 Seuzach, Zurich, Switzerland: Method And Appartus For Producing A Gaseous Fuel By Means Of Solar Energy

4,149,859 Shell Internationale Research Maatchappij B.V.: Process For Cooling And Separation Of Dry Particulate Matter From A Hot Gas

4,149,971 Krupp-Koppers GmbH Fed. Rep. Of Germany: Two-Stage Process And Apparatus For The Separation Of Tar

4,150,953 General Electric Company: Coal Gasification Power Plant And Process

4,151,044 Occidental Research Corporation: Process For The Pyrolysis Of Carbonaceous Materials In A Double Helix Cyclone

4,151,191 The American Gas Association: Sulfur Resistent Molybdenum Catalysts For Methanation

4,153,426 Arthur G. McKee & Company: Synthetic Gas Production

4,153,427 The U.S. of America as rep. by the U.S. DoE, Wash. D.C.: Apparatus And Method For Feeding Coal Into A Coal Gasifier

4,154,581 Battelle Development Corporation: Two-Zone Fluid Bed Combustion Or Gasification Process

4,154,582 General Electric Company: Method Of Solids Discharge From Coal Gasifier Grate

4,155,985 Metallgesellschaft Aktiengesellschaft Frankfurt am Main, Fed. Rep. of Germany: Process Of Purifying Gases

4,155,990 Hitachi, Ltd.: Process For Removal And Recovery Of Sulfide From Coal Gas

4,157,244 Dr. C. Otto & Comp. GmbH, Fed. Rep. of Germany: Gas-Cooling Method And Apparatus

4,157,245 Chevron Research Company: Countercurrent Plug-Like Flow Of Two Solids

4,157,246 Exxon Research & Engineering Co.: Hydrothermal Alkali Metal Catalyst Recovery Process

4,158,552 Combustion Engineering, Inc.: Entrained Flow Coal Gasifier

4,158,637 Westinghouse Electric Corp.: Conversion Of Coal Into Hydrocarbons

4,158,697 Clean Energy Corporation: Coal Treatment Apparatus

4,158,948 Texaco, Inc.: Conversion Of Solid Fuels Into Fluid Fuels

4,159,195 Exxon Research & Engineering Co.: Hydrothermal Alkali Metal Recovery Process

4,159,201 Krupp-Koppers GmbH, Fed. Rep. of Germany: Process For Producing A Carbon Monoxide-Rich Gas

4,159,236 Gulf Oil Corporation: Method For Combining Coal Liquefaction And Gasification Process

4,159,237 Gulf Oil Corporation: Coal Liquefaction Process Employing Fuel From A Combined Gasifier

4,159,238 Gulf Oil Corporation: Integrated Coal Liquefaction Gasification Process

4,160,649 UOP, Inc.: Substituted Natural Gas Via Steam Reforming Of Kerosene

4,161,393 Metallgesellschaft Aktiengesellschaft, Frankfurt am Main: Shift Conversion Of Raw Gas From Gasification Of Coal

4,161,442 Mobil Oil Corporation: Processing Of Tar Sands

4,164,397 Herbert H. Hunt, 3608 Vine Maple, Eugene, Oreg. 97405 & Harold S. Worcester, 91040 Hill Rd., Springfield, Oreg., 97417: Fuel Gas Production

4,165,970 Metallgesellschaft Aktiengesellschaft Frankfurt am Main: Process And Apparatus For Gasifying Granular Coal Under Superatmospheric Pressure

II. B. IN VITRO CONVERSION: OBTAINING FUEL GAS

2. APPARATUS

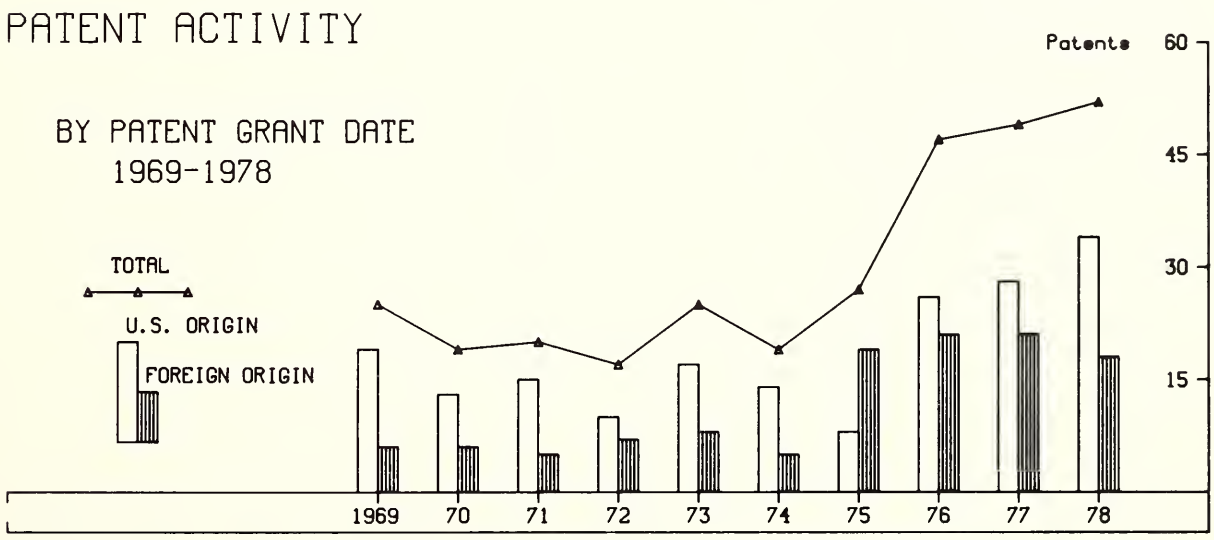
This profile includes the apparatus to carry out the processes described in the preceding profile.

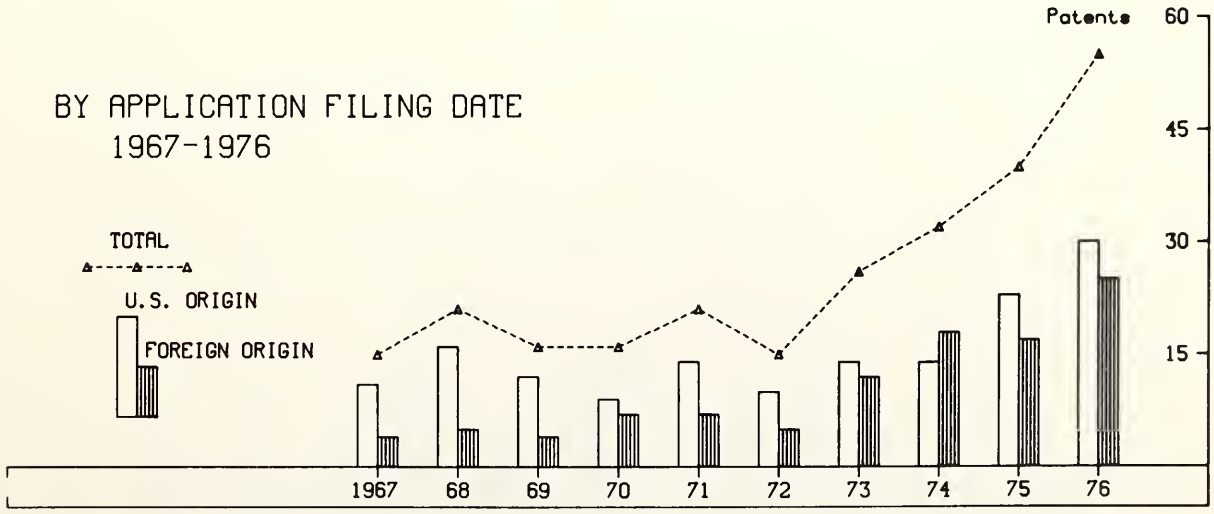
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 48, Subclasses 61-113 and 118.5

ACTIVITY INDICES (1976-1978)

GROWTH	49.3%
FOREIGN SHARE	40.5%
CORPORATE OWNED	79.0%
GOVERNMENT OWNED	5.4%
U.S. OWNED OF FOREIGN	6.7%





PATENT ACTIVITY (1963-1978) BY OATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	15	12	13	11	8	25	19	20	17	25	19	27	47	49	52	359
U.S. ORIGIN	7	8	10	7	6	19	13	15	10	17	14	8	26	28	34	222
FOREIGN ORIGIN	8	4	3	4	2	6	6	5	7	8	5	19	21	21	18	137
GERMANY	3	1	1	2			3	1	3	5	1	10	10	14	8	62
UNITEO KINGOOM	1	1	1	1	1	1	2	2			2	2	1		7	22
JAPAN		1					1		1	2	1	4	5	4	2	21
FRANCE	1	1			1	2		1	2		1					9
SWEOEN	1											2	1	1		5
NETHERLANOS	1							1				1	1	1		5
CANAOA	1			1		1			1							4
SOUTH AFRICA													2			2
PHILIPPINES			1			1										2
U.S.S.R.														1		1
POLANO													1			1
CHINA(TAIWAN)															1	1
OENMARK										1						1
ITALY						1										1
U.S. ORIGIN	7	8	10	7	6	19	13	15	10	17	14	8	26	28	34	222
U.S. CORP. OWNEO	4	5	3	5	3	17	12	12	7	12	11	7	16	19	26	159
U.S. GOVT. OWNEO		1	1	1		;	1	1		1			5	1	2	15
U.S. INOIV. OWNEO	2	2	6	1	3	1		2	3	4	3	1	5	7	6	46
FOREIGN OWNED	1													1		2
FOREIGN ORIGIN	8	4	3	4	2	6	6	5	7	8	5	19	21	21	18	137
U.S. OWNEO	1						1	1		2	1	2	2		2	12
FOREIGN OWNEO	7	4	3	4	2	6	5	4	7	6	4	17	19	21	16	125
FOREIGN CORP.	6	3	1	3	2	4	2	3	6	5	4	13	18	19	14	103
FOREIGN GOVT.																
FOREIGN INOIV.	1	1	2	1		2	3	1	1	1		4	1	2	2	22

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	14	10	14	15	21	16	16	21	15	26	32	40	55	24		319
U.S. ORIGIN	11	5	9	11	10	12	9	14	10	14	14	23	30	19		197
FOREIGN ORIGIN	3	5	5	4	5	4	7	7	5	12	18	17	25	5		122
GERMANY	1	1		1	3	1	3	5	1	6	10	9	15	1		57
UNITED KINGDOM	2		2	1	1	1		1	2	1	1		4	3		19
JAPAN				1			3		1	2	7	2	4			20
FRANCE		2	1	1	1		1		1							7
SWEDEN										2		1	1			4
NETHERLANDS						1				1		1	1			4
CANADA		1	1			1										3
SOUTH AFRICA												2				2
PHILIPPINES			1													1
U.S.S.R.												1				1
POLAND												1				1
CHINA(TAIWAN)														1		1
DENMARK								1								1
ITALY		1														1
U.S. ORIGIN	11	5	9	11	16	12	9	14	10	14	14	23	30	19		197
U.S. CORP. OWNED	7	5	8	10	12	10	8	8	8	12	8	14	22	15		147
U.S. GOVT. OWNED			1	1	2			1			1	4	3			13
U.S. INDIV. OWNED	4				2	2	1	5	2	2	5	4	5	4		36
FOREIGN OWNED												1				1
FOREIGN ORIGIN	3	5	5	4	5	4	7	7	5	12	18	17	25	5		122
U.S. OWNED				1		1	1	2	1	1		2	1	1		11
FOREIGN OWNED	3	5	5	3	5	3	6	5	4	11	18	15	24	4		111
FOREIGN CORP.	3	4	3	1	4	1	6	4	4	8	17	13	22	3		93
FOREIGN GOVT.																
FOREIGN INDIV.		1	2	2	1	2		1		3	1	2	2	1		18

II.B. IN VITRO CONVERSION - OBTAINING FUEL GAS
2. APPARATUS

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

UNITED TECHNOLOGIES CORPORATION	14
EXXON RESEARCH + ENGINEERING CO.	11
GENERAL ELECTRIC COMPANY	8
DR. C. OTTO COMP. G.M.B.H.	8
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	8
SIEMENS AKTIENGESELLSCHAFT	8
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	7
BRITISH GAS CORPORATION	7
OCCIDENTAL PETROLEUM CORPORATION	6
TEXAS INSTRUMENTS, INCORPORATED	5
TEXACO DEVELOPMENT CORPORATION	5
KAMYR INC.	5
MITSUI SHIPBUILDING AND ENGINEERING CO. LTD.	5
UNION CARBIDE CORPORATION	4
UNITED STATES OF AMERICA, INTERIOR	4
CALIFORNIA INSTITUTE OF TECHNOLOGY	3
KOPPELMAN, EDWARD	3
INSTITUTE OF GAS TECHNOLOGY	3
GAS COUNCIL	3
ECONO FUEL SYSTEMS, INC.	3
MCDOWELL-WELLMAN ENGINEERING COMPANY	3
NISSAN MOTOR CO., LTD.	3
SUN OIL COMPANY OF PENNSYLVANIA	3
STEAG AG	3*
ALLIED CHEMICAL CORPORATION	2
KINGSFORD COMPANY	2
SHELL OIL COMPANY	2
INGERSOLL-RAND RESEARCH INC.	2
TEXACO INC.	2
COMBUSTION ENGINEERING INC.	2
HEINRICH KOPPERS GMBH	2*
CHEVRON RESEARCH COMPANY	2
CONSOLIDATION COAL COMPANY	2
CHEMICAL CONSTRUCTION CORPORATION	2
TORRAX SYSTEMS, INC.	2
KRUPP KOPPERS GMBH	2
THAGARD TECHNOLOGY COMPANY	2
MOBIL OIL CORPORATION	2
AB MOTALA VERKSTAD	2
UNIVERSITY OF CALIFORNIA, THE REGENTS OF	2
URBAN RESEARCH DEVELOPMENT CORPORATION	2
WESTINGHOUSE ELECTRIC CORP.	2
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.	2*
RHEINISCHE BRAUNKOHLENWERKE AG	2*

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AB MOTALA VERKSTAO
3884397 - APPARATUS FOR FEEDING MATERIAL TO A GAS GENERATOR
3994418 - METHOO OF FEEDING MATERIAL TO A GAS GENERATOR

AGENCE NATIONALE OE VALORISATION DE LA RECHERE (ANVAR)
3945810 - APPARATUS FOR DISPOSAL OF PLASTICS

ALLIEO CHEMICAL CORPORATION
3469966 - BICYCLIC AMIDES HAVING HERBICIOAL PROPERTIES
3770387 - DEFLECTOR

ARTHUR D. LITTLE INC.
3712800 - METHOD FOR CONVERTING RESIDUAL OILS INTO FUEL GAS

ATLANTIC RICHFIELO COMPANY
3620697 - APPARATUS AND METHOO FOR PRODUCING HYDROGEN

BABCOCK + WILCOX CO.
3454383 - GASIFICATION METHOO ANO APPARATUS

BATTELLE MEMORIAL INSTITUTE
4044904 - METHOD OF FEEOING PARTICLES FROM A FIRST REGION TO A SECONO REGION

BERGWERKSVERBANO GMBH
4080181 - GAS GENERATOR

BIO-GAS CORPORATION
4057401 - METHANE GAS PROCESS AND APPARATUS

BLACK, SIVALLS + BRYSON, INC.
3533739 - COMBUSTION OF SULFUR-BEARING CARBONACEOUS FUEL

BLUE EMBER FLAME CORPORATION
3933618 - GAS GENERATION APPARATUSES ANO PROCESSES

BORGGREEN, GEORG
3771263 - METHOD FOR DISPOSAL OF REFUSE BY DEGASIFYING ANO GASIFICATION THEREOF

BRITISH GAS CORPORATION
3830637 - FLUIDISEO BED HYDROGENATION
4071329 - COAL GASIFICATION PLANT
4073627 - COAL GASIFICATION PLANT
4078903 - COAL GASIFICATION
4119411 - COAL GASIFICATION PLANT
4126427 - COAL GASIFICATION PLANT
4129422 - COAL GASIFICATION PLANT

CALIFORNIA INSTITUTE OF TECHNOLOGY
3920416 - HYOROGEN-RICH GAS GENERATOR
3955941 - HYOROGEN RICH GAS GENERATOR
4033133 - START UP SYSTEM FOR HYDROGEN GENERATOR USED WITH AN INTERNAL COMBUSTION ENGINE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CATALYTIC GENERATORS, INC.
3951610 - GAS GENERATING APPARATUS

CHEMICAL CONSTRUCTION CORPORATION
3450507 - INTEGRATED REFORMING OF HYDROCARBONS
3531266 - PRODUCTION OF SYNTHETIC METHANOL

CHEMISCHE WERKE HULS, AG
4018621 - METHOD FOR REMOVING SLAG CAKES FROM SYNTHESIZING GAS REACTORS

CHEVRON RESEARCH COMPANY
3759677 - CATALYTIC SYNTHESIS GAS MANUFACTURE
3874116 - SYNTHESIS GAS MANUFACTURE

CHICAGO BRIDGE + IRON COMPANY
3713794 - DIRECT CONTACT LIQUID GASIFIER AND METHOD

CITIES SERVICE COMPANY
3628929 - METHOD FOR RECOVERY OF COAL ENERGY

CLEAN ENERGY CORPORATION
3933128 - STEAM GENERATION WITH COAL

COAL INDUSTRY (PATENTS) LIMITED
4105419 - FLUIDIZED BED APPARATUS

COMBUSTION ENGINEERING INC.
3864100 - METHOD AND APPARATUS FOR GASIFICATION OF PULVERIZED COAL
3920417 - METHOD OF GASIFYING CARBONACEOUS MATERIAL

COMPAGNIE INDUSTRIELLE DE PROCEDES + D APPLICATIONS S.A.
3840345 - SELF AGGLOMERATING FLUIDIZED BED REACTING APPARATUS

CONSOLIDATED NATURAL GAS SERVICE CO. INC.
3820964 - REFUSE GASIFICATION PROCESS AND APPARATUS

CONSOLIDATION COAL COMPANY
3503724 - METHOD AND APPARATUS FOR PRODUCING MIXTURES OF METHANE, CARBON MONOXIDE, AND HYDROGEN
3700421 - APPARATUS FOR CONDUCTING A CONTINUOUS STEAM-IRON PROCESS

DAIMLER-BENZ AKTIENGESELLSCHAFT
4067299 - SPLIT-GAS PRODUCTION FOR INTERNAL COMBUSTION ENGINE

DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT VORMALS ROESSLER
3741736 - PROCESS AND DEVICE FOR THE PRODUCTION OF ACETYLENE-ETHYLENE MIXTURES

DICK, E. SAM, CO., INC.
3469956 - STANDBY LIQUEFIED PETROLEUM GAS UNIT

DOW CHEMICAL COMPANY
3429942 - QUENCHING TECHNIQUE FOR HYDRODEALKYLATION OF ALKYL AROMATIC HYDROCARBON

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

OR. C. OTTO COMP. G.M.B.H.
3951615 - CYLINDRICAL PRESSURE REACTOR FOR PROOUCING A COMBUSTIBLE GAS
3994700 - APPARATUS FOR THE LOW TEMPERATURE CARBONIZATION OF FINE-GRAIN FUELS
4013427 - SLAG BATH GENERATOR
4043766 - SLAG BATH GENERATOR
4049394 - CONTROL SYSTEM FOR A COAL GASIFICATION PLANT
4049570 - METHOD ANO APPARATUS FOR REMOVING VAPORS ANO AEROSOLS FROM GASES PRODUCED IN A GASIFICATION PLANT
4073628 - CONTROL SYSTEM FOR APPARATUS TO GASIFY FINE-GRAIN FUELS IN A REACTOR
4098324 - WATER-COOLEO, HIGH-TEMPERATURE GASIFIER ANO METHOO FOR ITS OPERATION

ECONO FUEL SYSTEMS, INC.
4023538 - HOT FUEL GAS GENERATOR
4050419 - HOT FUEL GAS GENERATOR
4114566 - HOT FUEL GAS GENERATOR

EISENWERK-GESELLSCHAFT MAXIMILIANSHUTTE MBH
4062657 - METHOO AND APPARATUS FOR OESULPHURIZING IN THE GASIFICATION OF COAL

EKMAN, CARL OSCAR ALEXANDER
3587489 - FURNACES FOR SOLIO FUEL

ENERGY RESEARCH CORPORATION
4112889 - FUEL SYSTEM AND VAPORIZER .O INTERNAL COMBUSTION ENGINES

ESSO STANDARO SOCIETE ANONYME FRANCAISE
3480419 - GASIFICATION OF HYDROCARBONS

EXXON RESEARCH + ENGINEERING CO.
3661543 - FLUIO COKING PROCESS INCORPORATING GASIFICATION OF PRODUCT ORE
3752658 - INTEGRATEO FLUIO COKING-GASIFICATION PROCESS
3759676 - INTEGRATED FLUIO COKING/GASIFICATION PROCESS
3784676 - REMOVING SULPHUR FROM HYOROCARBONS
3816084 - COKELESS COKER WITH RECYCLE OF COKE FROM GASIFIER TO HEATER
3870480 - PROCESS ANO APPARATUS FOR THE PROOUCTION OF COMBUSTIBLE GASES
3874739 - METHOO ANO APPARATUS FOR THE TRANSFER OF ENTRAINEO SOLIOS
3933445 - PROCESS ANO APPARATUS FOR PREVENTING DEPOSITS ON A GAS INLET NOZZLE
4007093 - FURNACE FOR THERMAL PROCESSING OF LUMP SOLID FUEL
4055484 - ELUTRIATION IN A FLUIO COKING PROCESS
4062656 - FLUIOIZEO BEO APPARATUS

FLUOR CORPORATION
3533764 - REACTOR CONTROL SYSTEM

FOREST FUELS, INC.
4095958 - APPARATUS ANO METHOO FOR PROOUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

FOSTER WHEELER CORPORATION
3825477 - FLUIOIZED BEO REACTOR

FOSTER WHEELER ENERGY CORPORATION
3998608 - PROOUCTION OF HOT CLEAN INOUSTRIALLY USABLE GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

FRIED KRUPP HUTTENWERKE AG
3923466 - APPARATUS FOR THE PRODUCTION OF CRACKED GAS

FRIEDRICH UHDE GMBH
3600141 - TUBE FURNACE FDR RECOVERY DF SYNTHESIS GASES FRDM HYDRDCARBDN CRACKING

FUJI KASUI ENGINEERING CD., LTD.
3997407 - APPARATUS FDR DISPOSAL DF RUBBER WASTE

GAS CDUNCIL
3484219 - PRDCESS AND APPARATUS FOR PERFDRMING CHEMICAL REACTIDNS
3591356 - PROCESS FDR THE PRODUCTIDN OF A GAS CDNTAINING GASEOUS HYDRDCARBDNS
3868226 - REACTION VESSELS

GENERAL ATDMIC CDMPANY
3980440 - CATALYST TUBE ASSEMBLY FDR STEAM-HYDRDCARBDN REFORMER

GENERAL ECDLOGICAL SYSTEMS, INC.
3579320 - PROCESS FDR PRDDUCING AND RECOVERING VALUABLE MATERIALS FRDM MUNICIPAL WASTE

GENERAL ELECTRIC CDMPANY
3541729 - CDMPACT REACTDR-BDILER CDMBINATIDN
3607125 - REFDRMER TUBE CDNSTRUCTION
3812620 - APPARATUS AND PROCESS FOR SEGREGATING AND DECOMPDSING HETERDGENEDUS WASTE MATERIALS
4011059 - SELF-CENTERING TRAVERSING STIRRER SHAFT FDR FIXED BED GASIFIER
4070161 - DDUBLE SEAL GATE VALVE STRUCTURE
4085578 - PRDDUCTION OF WATER GAS AS A LDAD LEVELING APPRDACH FDR CDAL GASIFICATIDN PDWER PLANTS
4098586 - GRATE FDR COAL GASIFIER
4101294 - PRDDUCTION OF HOT, SATURATED FUEL GAS

GULF OIL CORPDRATIDN
3971639 - FLUID BED CDAL GASIFICATION

HEINRICH KODPERS GMBH
3873845 - METHDD OF PRDDUCING ELECTRIC ENERGY INCLUDING CDAL GASIFICATIDN
3883321 - DEVICE FDR GASIFICATIDN DF SOLID FUELS

HERCULES INCDRPORATED
3736111 - PROCESS AND APPARATUS FDR THE CDMPLETE RECLAMATIDN DF VALUABLE PRODUCTS FRDM SDLID WASTE

HDWE-BAKER ENGINEERS INC.
3523770 - FLAME SPLITTING ARRANGEMENT

HUTTENWERK DBERHAUSEN AG., FIRMA
3536455 - PLANT FDR THE PRDDUCTION OF METALLURIGICAL REDUCING GAS

HYDRDCARBDN RESEARCH INC.
3775071 - METHDD FOR FEEDING DRY COAL TD SUPERATDMOSPHERIC PRESSURE

INGERSOLL-RAND RESEARCH INC.
3976548 - APPARATUS FDR PROCESSING COAL AND LIKE MATERIAL
4106997 - METHODS FDR CDNVERTING COAL TO A PLASTIC-LIKE CONDITIDN AND FEEDING SAME TD A RECEIVER

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

INSTITUTE OF GAS TECHNDLOGY
3935825 - CDAL ASH AGGLOMERATIDN DEVICE
4021183 - ARRANGEMENT AND METHDD DF BURNER IGNITIDN
4023280 - VALVE FOR ASH AGGLDMERATION DEVICE

JAPAN ATOMIC ENERGY RESEARCH INSTITUTE
3899420 - STEAM REFORMER FDR HYDRDCARBDNS

KAMYR INC.
3950146 - CDNTINUDUS PRDCESS FDR ENERGY CDNSERVING CDOPERATIVE CDAL FEEDING AND ASH REMDVAL OF CDNTINUOUS, PRESSURIZED COAL GASIFIERS AND THE LIKE, AND APPARATUS FDR CARRYING DUT THE SAME
3950147 - PRDCESS FDR FEEDING CDAL TO A FLUIDIZED BED OR SUSPENDED PARTICLE PRESSURIZED PRDCESSING CHAMBER AND APPARATUS FDR CARRYING OUT THE SAME
4017270 - CDAL GASIFICATIDN PRDCESS WITH IMPRDVED PRDCEDURES FOR CDNTINUDUSLY FEEDING LUMP CDAL UNDER PRESSURE
4073629 - CDAL GASIFICATIDN PRDCESS WITH IMPRDVED PRDCEDURE FDR CDNTINUDUSLY DISCHARGING ASH PARTICLES AND APPARATUS THEREFOR
4125384 - METHDD AND APPARATUS FOR CDNTINUDUSLY FEEDING SDLID PARTICLES INTD A PRESSURIZED CDNTAINER

KINGSFDRD CDMPANY
3852048 - PRDCESS FOR PRODUCING INDUSTRIAL FUEL FROM WASTE WODDY MATERIALS
3977947 - FLUIDIZED BED CARBONIZATION

KOPPELMAN; EDWARD
4069107 - CDNTINUDUS THERMAL REACTDR SYSTEM AND METHDD
4106999 - CONTINUOUS THERMAL REACTOR
4126519 - APPARATUS AND METHOD FDR THERMAL TREATMENT DF DRGANIC CARBDNACEDUS MATERIAL

KRAFTWERK UNIDN AKTIENGESELLSCHAFT
4095959 - COAL GASIFICATION APPARATUS

KRUPP KOPPERS GMBH
3958956 - METHANE PRDDUCTION PROCESS AND ARRANGEMENT THEREFDR
4017269 - METHDD AND ARRANGEMENT FDR GASIFYING FINELY DIVIDED FLUIDIZED SDLID COMBUSTIBLE MATERIAL

LACRETA; ANTONIO
4090485 - FUEL SYSTEMS FOR INTERNAL COMBUSTIDN ENGINES

LA SDCIETE DITE SDCIETE CHIMIQUE DE LA GRANDE
3644100 - APPARATUS FDR REFORMING HEAVY HYDRDCARBDNS

MARATHDN DIL CDMPANY
3723067 - PYRDLYSIS FURNACE HAVING TRANSVERSE MIXING MEANS IN THE END STACKS

MASCHINENFABRIK AUGSBURG-NURNBERG AKTIENGESELLSCHAFT
3912464 - METHDD OF AND DEVICE FOR SEPARATING SOLID CDMPONENTS FRDM A HDT CDMBUSTIBLE GAS GENERATED IN A REACTOR

MCDOWELL-WELLMAN ENGINEERING COMPANY
3454382 - TWO-STAGE TYPE GAS PRODUCER
3787192 - PROCESS FDR COAL GASIFICATION
3847562 - GAS PRDDUCER HAVING ASH REMOVAL PLATES WITH INDIVIDUAL TEMPERATURE SENSING

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3902872 - REACTOR FOR GASIFYING COAL UNDER PRESSURE
3930811 - REACTOR FOR THE PRESSURE GASIFICATION OF COAL
3937620 - PROCESS AND APPARATUS FOR GASIFYING COAL
3951616 - APPARATUS FOR THE CONTINUOUS GASIFICATION OF COAL
4014664 - REACTOR FOR THE PRESSURE GASIFICATION OF COAL
4033730 - PROCESS AND APPARATUS FOR FEEDING PARTICULATE SOLIDS INTO A PRESSURE REACTOR
4040800 - REACTOR FOR GASIFYING SOLID FUELS, PARTICULARLY COAL, UNDER SUPERATMOSPHERIC PRESSURE
4047901 - FEEDER FOR COAL-GASIFICATION REACTOR

MIDLAND-ROSS CORPORATION
3970435 - APPARATUS AND METHOD FOR METHANATION

MITSUBISHI JUKOGYO KABUSHIKI KAISHA
4074979 - THERMAL DECOMPOSITION APPARATUS

MITSUI SHIPBUILDING AND ENGINEERING CO. LTD.
3718708 - METHOD AND APPARATUS FOR THERMAL CRACKING AND QUENCHING
3729297 - APPARATUS FOR CONTINUOUSLY DECOMPOSING HYDROCARBON IN A HEATING MEDIUM BATH
3832151 - PROCESS AND APPARATUS FOR DISPOSAL OF PLASTIC WASTES
3907662 - PROCESS OF PREPARING DESULFURIZED LIGHT OIL AND FUEL GAS FROM HEAVY OIL
3941681 - PROCESS FOR CONVERTING INFERIOR HEAVY OIL INTO LIGHT OIL AND GASIFYING THE SAME

MITSUI TOATSU CHEMICALS INC.
4115074 - GASIFICATION PROCESS

MOBIL OIL CORPORATION
4046522 - PRE-ENGINE CONVERTER FOR USE WITH FUELS CONTAINING OXYGENATED COMPOUNDS
4070993 - PRE-ENGINE CONVERTER

MONTECATINI EDISON S.P.A.
3462250 - PROCESS AND APPARATUS FOR THE PARTIAL COMBUSTION OF LIQUID HYDROCARBONS TO GASEOUS MIXTURES CONTAINING HYDROGEN AND CARB
ON MONOXIDE

NATIONAL RESEARCH DEVELOPMENT CORPORATION
3962045 - APPARATUS FOR PYROLYSIS OF DOMESTIC AND OTHER WASTE MATERIALS

NIPPON CARBON COMPANY LIMITED
3927986 - APPARATUS FOR INCINERATING A PLASTIC WASTE

NIPPON KOKAN KABUSHIKI KAISHA
3998606 - METHOD AND APPARATUS FOR MANUFACTURING REDUCING GAS

NIPPON SOKEN, INC.
4036180 - FUEL REFORMING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

NISSAN MOTOR CO., LTD.
3963000 - SYSTEM FOR REFORMING ENGINE FUEL INTO HYDROGEN GAS-CONTAINING MIXTURE BY CATALYTIC REACTION
4059076 - METHOD AND APPARATUS FOR GENERATING REFORMED GAS CONTAINING HYDROGEN AND CARBON MONOXIDE FROM HYDROCARBON FUEL
4059415 - APPARATUS FOR REFORMING COMBUSTIBLE INTO GASEOUS FUEL BY REACTION WITH DECOMPOSITION PRODUCT OF HYDROGEN PEROXIDE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

NORTH AMERICAN UTILITY CONSTRUCTION CORPORATION
3481721 - PROCESS FOR MAKING FUEL GAS

OCCIDENTAL PETROLEUM CORPORATION
4070250 - PYROLYSIS OF CARBONACEOUS MATERIALS IN A DOUBLE HELIX CYCLONE
4077847 - SOLID WASTE DISPOSAL SYSTEM
4083751 - CONTINUOUS FEED PYROLYSIS CHAMBER FOR DECOMPOSING SOLID WASTE
4088541 - APPARATUS FOR PYROLYZING ORGANIC SOLID WASTE
4101412 - PROCESS AND APPARATUS FOR RAPID PYROLYSIS OF CARBONACEOUS MATERIALS
4105502 - SIMPLIFIED LIQUEFACTION PYROLYSIS PROCESS AND APPARATUS THEREFOR

PARAHO CORPORATION
4116810 - INDIRECT HEATING PYROLYSIS OF OIL SHALE

PHILLIPS PETROLEUM COMPANY
4003343 - METHOD AND APPARATUS FOR MAINTAINING THE OPERATING TEMPERATURE IN A DEVICE FOR REDUCING ENGINE EXHAUST POLLUTANTS

POLITECHNIKA SLASKA IM WINCENTEGO PSTROWSKIEGO
3988210 - FURNACE FOR MANUFACTURING HIGH CALORIFIC GAS AND COKE FROM COAL

PULLMAN, INCORPORATED
3671198 - CRACKING FURNACE HAVING THIN, STRAIGHT SINGLE PASS REACTION TUBES

Q HU L CORPORATION
4029481 - SELF POWERED BLUE WATER GAS GENERATOR

REINISCHE BRAUNKOHLENWERKE A.G.
3761233 - METHOD OF GASIFYING WATER CONTAINING COAL

RHEINISCHE BRAUNKOHLENWERKE AG
3647379 - METHOD OF GASIFYING WATER-CONTAINING COAL

SELAS CORPORATION OF AMERICA
3607153 - QUENCH ARRANGEMENT

SERVICE NATIONAL DIT GAZ DE FRANCE
3556750 - PROCESS FOR THE MANUFACTURE UNDER PRESSURE OF GASES WHICH MAY BE SUBSTITUTED FOR NATURAL GASES

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
4022591 - COAL GASIFICATION APPARATUS

SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ B.V.
3994701 - METHOD AND APPARATUS FOR FEEDING COMMINUTED SOLID FUEL INTO PLENUM CHAMBERS

SHELL OIL COMPANY
3868331 - PROCESS FOR THE PARTIAL COMBUSTION OF HYDROCARBONACEOUS FUELS TO PRODUCE SUBSTANTIALLY SOOT-FREE GASES
3972690 - GASIFICATION PROCESS

SIEGENER AKTIENGESELLSCHAFT GEISWEID
3658498 - METHOD AND APPARATUS FOR PRODUCING ETHYLENE AND SYNTHESIS GAS BY THERMAL CRACKING

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SIEMENS AKTIENGESELLSCHAFT
3798005 - APPARATUS FOR OBTAINING HYDROGEN
3871838 - APPARATUS FOR REACTING VAPORIZED, GASIFIED OR ATOMIZED HYDROCARBON WITH A GAS SERVING AS AN OXYGEN CARRIER
3897225 - METHOD AND APPARATUS FOR GENERATING A GAS MIXTURE TO BE FORMED THROUGH CATALYTIC CONVERSION OF FUEL AND A GAS SERVING AS AN OXYGEN CARRIER
3954422 - MULTI-STAGE REFORMED-GAS GENERATOR
3954423 - QUICK START DEVICE FOR REFORMED-GAS GENERATORS
3996025 - APPARATUS FOR DISTRIBUTING FLOWING MEDIA FROM ONE FLOW CROSS SECTION TO A FLOW SECTION DIFFERENT THEREFROM
4018573 - REACTOR FOR THE CATALYTIC CONVERSION OF HYDROCARBONS WITH A GAS CONTAINING OXYGEN TO FORM A FUEL GAS
4112876 - METHOD AND APPARATUS FOR STARTING UP A GAS GENERATOR FOR CONVERTING HYDROCARBONS INTO A FUEL GAS, AND AN INTERNAL COMBUSTION ENGINE TO BE SUPPLIED WITH THE FUEL GAS

SOCIETE ANONYME ACTIVIT
3677727 - PROCESS OF ACTIVATION AND GASIFICATION OF FLUIDISED CARBONACEOUS MATERIALS

SOCIETE DE CONSTRUCTION D APPAREILS POUR GAZ A L EAU
3475135 - REFORMING FURNACE FOR PRODUCING SYNTHESIS GAS

STEAG AG
3892542 - REACTOR FOR PRESSURE TYPE GASIFICATION OF COAL
4111665 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL, ESPECIALLY OF FINE COAL IN A GENERATOR

STEAG AKTIENGESELLSCHAFT
4036606 - METHOD OF CLEANING GASES AND APPARATUS THEREFOR

STOCK EQUIPMENT COMPANY
4089429 - APPARATUS FOR INTRODUCING PARTICULATE MATERIAL INTO A VESSEL

STONE + WEBSTER ENGINEERING CORPORATION
3593968 - RAPID COOLING FOR HIGH TEMPERATURE GAS STREAMS

STORA KOPPARBERGS BERGSLAGS AB
4026679 - APPARATUS FOR AND PROCESS OF CONVERTING CARBONACEOUS MATERIALS CONTAINING SULPHUR TO AN ESSENTIALLY SULPHUR-FREE COMBUSTIBLE GAS

SUN OIL COMPANY OF PENNSYLVANIA
3480416 - GAS PREPARATION PROCESS AND APPARATUS
3480689 - CRACKING OF HYDROCARBONS
3481720 - PROCESS AND APPARATUS FOR THE DISTILLATION OF SOLIDS

SYNGAS RECYCLING CORPORATION
4005994 - PROCESS AND APPARATUS FOR CONVERTING SOLID WASTES TO PIPELINE GAS

TEXACO DEVELOPMENT CORPORATION
3551347 - OXIDATION PROCESS WITH IMPROVED WASTE HEAT BOILER
3565588 - GAS GENERATOR AND WASTE HEAT BOILER INTERCONNECTED SYSTEM
3738940 - METHOD OF OPERATING A BURNER FOR THE PARTIAL OXIDATION OF HYDROCARBONS TO SYNTHESIS GAS
3743606 - SYNTHESIS GAS GENERATION
3847564 - APPARATUS AND PROCESS FOR BURNING LIQUID HYDROCARBONS IN A SYNTHESIS GAS GENERATOR

TEXACO INC.
3607157 - SYNTHESIS GAS FROM PETROLEUM COKE
3620698 - HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXAS INSTRUMENTS, INCDRPDRATED
3453146 - METHDD AND APPARATUS FOR REFDRMING CARBDNACEDUS FUELS AND DPERATING FUEL CELL
3516807 - APPARATUS FOR PRODUCING HYDRDGEN GAS BY THE PARTIAL OXIDATIDN OF A CARBDNACEDUS FUEL CDNTAINING HYDROGEN
3545947 - LIQUID FUEL-AIR PARTIAL OXIDATIDN SYSTEM
3619144 - APPARATUS FDR REFDRMING HYDROCARBDN FUELS TO PRDDUCE HYDRDGEN
3685977 - PARTIAL DXIDATION DF HYDROCARBDNS

THAGARD TECHNOLOGY COMPANY
4036181 - HIGH TEMPERATURE FLUID-WALL REACTDRS FOR TRANSPDRTATION EQUIPMENT
4057396 - FLUID-WALL REACTOR FOR HIGH TEMPERATURE CHEMICAL REACTIDN PRDCESSES

THERMAL RESEARCH + ENGINEERING CDRPDRATIDN
3738353 - VAPDRIZING APPARATUS

TMC, INC.
4111219 - INDUSTRIAL FUEL BLENDER AND FUEL BLENDING METHDD

TDKYD HEAT TREATING COMPANY
3682605 - METHOD AND APPARATUS FOR SDDT CONTRDLLING IN A THERMAL DECDMPDSITIDN DF A HYDRDCARBDN GAS

TDRRAX SYSTEMS, INC.
3511194 - METHDD AND APPARATUS FOR HIGH TEMPERATURE WASTE DISPOSAL
3702039 - PRODUCTION OF USABLE PRODUCTS FRDM WASTE MATERIAL

TOYOTA JIDOSHA KDGYO KABUSHIKI KAISHA
4008692 - VEHICLE-MDUNTED GASEDUS FUEL GENERATDR

UNDE, FRIEDRICH, G.M.B.H.
3688494 - PRDCESS AND APPARATUS FDR HEATING HYDROCARBDNS

UNION CARBIDE CDRPORATION
3729298 - SDLID REFUSE DISPOSAL PROCESS AND APPARATUS
3985518 - OXYGEN REFUSE CONVERTER
4017273 - PYRDLYSIS PRDCESS FOR CONVERTING REFUSE TD FUEL GAS
4046541 - SLAG QUENCHING METHOD FOR PYROLYSIS FURNACES

UNITED ENGINEERING + CDNSTRUCTDRS INC.
3429678 - PRDCESS AND APPARATUS FOR MANUFACTURING GAS RICH IN HYDRDGEN AND IN DXIDES DF CARBDN

UNITED STATES DF AMERICA, DEPARTMENT OF ENERGY
3945809 - METHDD AND APPARATUS FDR REMOVING COARSE UNENTRAINED CHAR PARTICLES FRDM THE SECDND STAGE DF A TWD-STAGE CDAL GASIFIER
3981690 - AGGLDMERATING CDMBUSTOR-GASIFIER METHDD AND APPARATUS FDR COAL GASIFICATIDN
3988123 - GASIFICATIDN OF CARBDNACEDUS SDLIDS
3993450 - ELECTRODE ASSEMBLY FDR A FLUIDIZED BED APPARATUS
4025317 - HIGH PRESSURE ROTARY PISTON COAL FEEDER FDR CDAL GASIFICATIDN APPLICATIDNS
4071151 - VIBRATORY HIGH PRESSURE COAL FEEDER HAVING A HELICAL RAMP
4078704 - COAL FEED LOCK

UNITED STATES DF AMERICA, INTERIDR
3463623 - PRDCESS FOR GASIFYING CAKING COALS
3551123 - SYSTEM EMPLOYING COAL AS FUEL IN A STEAM REFORMER
3565593 - CONVERGING-DIVERGING TYPE GAS-SDLIDS FLUIDIZER AND METHOD DF USE

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING
(CONTINUED)

UNITED STATES OF AMERICA, INTERIOR
3746522 - GASIFICATION OF CARBONACEOUS SOLIDS

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM
3982910 - HYDROGEN-RICH GAS GENERATOR

UNITED TECHNOLOGIES CORPORATION
3446594 - METHOD FOR GENERATING HYDROGEN-CONTAINING FEEDSTOCKS
3476534 - HYDROGEN GENERATOR INCLUDING DESULFURIZATION WITH LOW PRESSURE HYDROGEN FEEDBACK
3476535 - HYDROGEN GENERATOR INCLUDING DESULFURIZATION WITH DIFFUSED HYDROGEN FEEDBACK
3480417 - HYDROGEN GENERATOR INCLUDING A DESULFURIZER EMPLOYING A FEEDBACK EJECTOR
3522019 - APPARATUS FOR GENERATING HYDROGEN FROM LIQUID HYDROGEN-CONTAINING FEEDSTOCKS
3531263 - INTEGRATED REFORMER UNIT
3540854 - METAL-WATER FUELED REACTOR FOR GENERATING STEAM AND HYDROGEN
3635682 - FUEL CELL REACTOR-BURNER ASSEMBLY
3909299 - FUEL CELL SYSTEM INCLUDING REFORM REACTOR
3962411 - METHOD FOR CATALYTICALLY CRACKING A HYDROCARBON FUEL
4071330 - STEAM REFORMING PROCESS AND APPARATUS THEREFOR
4098587 - COMPACT MULTI-TUBE CATALYTIC REACTION APPARATUS
4098588 - MULTI-TUBE CATALYTIC REACTION APPARATUS
4098589 - CATALYTIC REACTION APPARATUS

UNIVERSITY OF CALIFORNIA, THE REGENTS OF
3639111 - METHOD AND APPARATUS FOR PREVENTING FORMATION OF ATMOSPHERIC POLLUTANTS IN THE COMBUSTION OF ORGANIC MATERIAL
3718446 - POLLUTANT-FREE PROCESS FOR PRODUCING A CLEAN BURNING FUEL GAS FROM ORGANIC-CONTAINING WASTE MATERIALS

URBAN RESEARCH DEVELOPMENT CORPORATION
3926582 - METHOD AND APPARATUS FOR PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS
3956076 - PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS TO FORM CERAMIC PRILLS

WALLACE-ATKINS OIL CORPORATION
4038152 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF WASTE MATERIAL

WALLACE ENERGY CONVERSION, INC.
4118282 - PROCESS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF HIGH MOLECULAR WEIGHT ORGANIC MATERIALS

WASHINGTON GAS LIGHT COMPANY
3607154 - REFRACTORY BED FOR GAS MACHINE AND PROCESS FOR PRODUCING OIL GAS

WELLMAN INCANDESCENT FURNACE COMPANY LIMITED
3527586 - PRODUCTION OF FUEL GAS

WESTINGHOUSE ELECTRIC CORP.
3804606 - APPARATUS AND METHOD FOR DESULFURIZING AND COMPLETELY GASIFYING COAL
3847563 - MULTI-STAGE FLUIDIZED BED COAL GASIFICATION APPARATUS AND PROCESS

WHIRLPOOL CORPORATION
3469947 - ATMOSPHERE GENERATOR

WILPUTTE CORPORATION
4131435 - AUTOMATIC CONTROL APPARATUS FOR OIL GAS MACHINE OPERATION

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BAUER	JOCHEN		ROSASTR. 61	D-4300 ESSEN		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
BRIMHALL	GEORGE	H.	435 MIRADA ROAD	HALF MOON BAY	CA	94109
4050907 - ORGANIC WASTE TREATING AND CONVERSION SYSTEM						
CAUGHEY	ROBERT	A.	CLINTON ROAD	ANTRIM	NH	03440
4030895 - APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS						
FLEMING	JOSEPH		15925 MCDERMITT ST.	FOUNTAIN VALLEY	CA	92708
4002438 - ORGANIC CONVERSION SYSTEM						
GOLD	LOUIS		2725 - 39TH ST., NORTHWEST	WASHINGTON	DC	20007
3985520 - GASIFICATION PROCESS AND APPARATUS						
GOLD	LOUIS		2725 39TH ST., NW.	WASHINGTON	DC	20007
4004895 - COAL REACTOR						
HAMRICK	JOSEPH	T.	6364 JAE VALLEY ROAD SE.	ROANOKE	VA	24014
4024912 - HYDROGEN GENERATING SYSTEM						
KAIMANN	WALTER		POLLERBECKS BRINK 40	D-4300 ESSEN		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
KEMP	KLAUS	M.	2410 ANACAPA ST.	SANTA BARBARA	CA	93105
3945890 - CONVERTER SYSTEM						
KUN-MING	LIU		NO. 52, LANE 63, LUNG KANG RD.	CHUNG LI		TW
4106914 - SAFETY FUEL GAS AND APPARATUS FOR GENERATING THE SAME						
KUNII	DAIZO		1-25-16 NAKAMACHI	MEGURO, TOKYO		JA
3912465 - CONTINUOUS CARBONIZATION AND GASIFICATION OF PARTICULATE COAL WITH DOUBLE RECIRCULATION OF FLUIDIZED PARTICULATE HEAT CARRIER						
KUNUGI	TAISEKI		7-17-22-903 ROPPONGI	MINATO, TOKYO		JA
3912465 - CONTINUOUS CARBONIZATION AND GASIFICATION OF PARTICULATE COAL WITH DOUBLE RECIRCULATION OF FLUIDIZED PARTICULATE HEAT CARRIER						
LINDSTROM	OLLE	B.	LORENSVIKSVAGEN 14, VIGBYHOLM	S-18363 TABY		SW
3918412 - FUEL TREATMENT FOR COMBUSTION ENGINES						
LIVEMORE	GERALD	SYDNEY	71, 7TH ST.	PARKMORE, SANDTON, T		ZA
3970436 - GAS PRODUCER ARRANGEMENTS						
PASTERNAK	RUDOLF		LUBECKER STR. 15	D-4390 GLADBECK		DT
4057400 - APPARATUS FOR THE GASIFICATION UNDER PRESSURE OF BITUMINOUS COAL ESPECIALLY OF FINE COAL IN A GENERATOR						
REED	THOMAS	G. JR.	818 HEATHER COURT	HOUSTON	TX	77024
4058205 - APPARATUS FOR TREATING OIL SHALE						
ROSE	LESLIE	C.	BOX 68	ROCKY MOUNT	VA	24251
4024912 - HYDROGEN GENERATING SYSTEM						

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
SADLER	JOHN	H.	16 LAKESIDE LA.	BOLTON	CT	06040
4101295 - APPARATUS FOR CONVERTING COAL INTO GAS SUBSTITUTES						
SCHLADITZ	HERMANN	J.	PLANTSCHWEG 74	MUNICH 60		DE
4106891 - ELECTRICAL HEATING DEVICE						
SCHLADITZ	HERMANN	J.	PLANTSCHWEZ 74	MUNICH		DT
3869242 - PROCESS FOR VAPORIZING FUEL OIL						
SQUIRES	ARTHUR	M.	245 W. 104 ST.	NEW YORK	NY	10025
3957457 - GASIFYING COAL OR COKE AND DISCHARGING ASH AGGLOMERATES						
3957458 - GASIFYING COAL OR COKE AND DISCHARGING SLAG FRIT						
4032305 - TREATING CARBONACEOUS MATTER WITH HOT STEAM						
VESTAL	GEORGE	W.	RT. 4, BOX 238	DENTON	TX	76201
3870611 - PROCESSING OF COAL TO PRODUCE LIQUID AND VAPOROUS HYDROCARBONS						
VROOMAN	RICHARD	A.	22628-87TH WEST	EDMONDS	WA	98020
4092963 - VAPORIZER-REGULATOR, LIQUID FUEL						
WAGNER	JOHANN		SANDSTRASSE 1/V	8500 NURNBERG		DT
3881885 - GAS GENERATOR						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3439998 - APPARATUS FOR PRODUCING COMBUSTIBLE GAS
3469944 - PROCESS AND APPARATUS FOR THE MANUFACTURE OF HYDROGEN
3475916 - VAPORIZER
3497335 - UNDERGROUND GASIFICATION OF COAL
3518035 - DEVICE FOR PRODUCING AN EXHAUST GAS-OIL MIXTURE TO/ BE SUPPLIED TO A MAIN BURNER OF A NOZZLE-FREE OIL-GASIFYIN G BURNER INSTALLATION
3524734 - DEVICE FOR PROMOTING PERFECT COMBUSTION OF LIQUEFIED PETROLEUM GAS FOR USE IN CARS
3556749 - GENERAL ELECTRIC COMPANY APPARATUS AND METHOD FOR THE HYDROGENATION OF COAL
3565594 - GASOLINE VAPOR GENERATOR
3578416 - HIGH TEMPERATURE REACTOR
3597327 - PROCESS FOR PYROLYZING A SOLID OR LIQUID HYDROCARBONACEOUS FUEL IN A FLUIDIZED BED
3649230 - OIL VAPORIZER
3664646 - CARBURETOR VAPOR SUPERHEATER
3668120 - TREATMENT OF ORGANIC WASTE PRODUCTS
3697256 - METHOD OF INCINERATING REFUSE
3728092 - PETROLEUM OIL VAPORIZER
3734833 - LOW SULPHUR FUEL SYSTEM
3746521 - GASIFICATION METHOD AND APPARATUS
3761359 - METHOD AND APPARATUS FOR HEAT-TREATING MATERIALS
3778240 - COKING PREVENTION SYSTEM
3787292 - APPARATUS FOR PYROLYSIS OF WASTES
3841851 - PROCESS AND APPARATUS FOR THE GASIFICATION OF ORGANIC MATTER
3853498 - PRODUCTION OF HIGH ENERGY FUEL GAS FROM MUNICIPAL WATES
3975913 - GAS GENERATOR AND ENHANCED ENERGY CONVERSION SYSTEMS

3079325	3086362	3088816	3104956	3107719	3117838	3117848	3120430	3124435	3131037	3142541	3144312
3151198	3156544	3157468	3164450	3170017	3174833	3175890	3184395	3190245	3192018	3197293	3204942
3218998	3226204	3226212	3227427	3230059	3236604	3253906	3254976	3257172	3257180	3261762	3273983
3291572	3291573	3291582	3294381	3297777	3306273	3311460	3314767	3322105	3322521	3323873	3325253
3350176	3353922	3357896	3362887	3376115	3383228	3384467	3390971	3398058	3404078	3406098	3838536

II.B. IN VITRO CONVERSION: OBTAINING FUEL GAS
2. APPARATUS

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,134,738	Foster Wheeler Energy Corporation: Automated Poking System For Coal Gasifier
4,134,739	Siemens Akteingesellschaft: Starting Device For A Reformed Gas Generator
4,135,885	Wormser Engineering, Inc.: Burning And Desulfizing Coal
4,135,889	University of Utah: Single Stage, Coal Gasification Reaction
4,137,051	General Electric Company: Grate For Coal Gasifier
4,137,052	Anthony A. du Pont, 12 Outrider Rd., Rolling Hills, CA 90274, & Joseph A. Connell, 24815 S. Normandie Ave., Harbor City, CA 90710: Apparatus And System For Producing Coal Gas
4,141,694	Technology Application Services Corporation: Apparatus For The Gasification Of Carbonaceous Matter By Plasma Arc Pyrolysis
4,142,867	Karl Kiener, 7081 Goldshofe, Ostalbkreis, Germany: Apparatus For The Production Of Combustible Gas
4,142,868	The U.S. of America, As Rep. By the U.S. DoE, Wash. D.C.: Wear Compensating Seal Means For Rotary Piston Coal Feeder
4,145,998	Econo Fuel Systems, Inc.: Hot Fuel Gas Generator
4,146,359	Occidental Petroleum Corporation: Method For Reacting Nongaseous Material With A Gaseous Reactant
4,146,370	Shell Internationale Research Maatschappij B.V.: Process And Apparatus For The Partial Combustion Of Coal Powder
4,149,856	Willy Keller, Hettlingerstrasse 7,8472 Switzerland: Method And Apparatus For Producing A Gaseous Fuel By Means Of Solar Energy
4,149,939	Salem Corporation: Method And Apparatus For Feeding An Oxidant Within A Furnace Enclosure

4,150,759 United States of America as rep. by The U.S. DoE, Wash. D.C.: Solids Feeder Apparatus

4,150,953 General Electric Company: Coal Gasification Power Plant And Process

4,150,954 Daimler-Benz Aktiengesellschaft, Fed. Rep. Of Germany: Split Gas Generator

4,151,044 Occidental Research Corporation: Process For The Pyrolysis Of Carbonaceous Materials In A Double Helix Cyclone

4,152,122 Syngas International, Ltd: Apparatus For The Production Of Methane Containing Gas By Hydrogasification

4,153,426 Artam G. McKee & Co.: Synthetic Gas Production

4,153,427 United States of America as rep. by the U.S. DoE, Wash. D.C.: Apparatus And Method For Feeding Coal Into A Coal Gasifier

4,155,720 The Broken Hill Proprietary Company, Ltd.: Apparatus For The Production Of Gaseous Mixtures

4,157,244 Dr. C. Otto & Comp. GmbH, Fed. Rep. Of Germany: Gas Cooling Method And Apparatus

4,157,896 Horizons Research Incorporated: Apparatus For The Production Of Carbon Monoxide And Hydrogen

4,157,958 Bernard H. Chow, 6340 Morazgan St., North Highlands, CA 95660: Inverted Vessel Processing Method For The Production Of Methane Gas

4,158,697 Clean Energy Corporation: Coal Treatment Apparatus

4,159,447 Dr. C. Otto & Comp. Gmbh, Fed. Rep. of Germany: System For Detecting Faults In The Wall Of A High-Temperature Pressure Vessel

4,162,943 Occidental Petroleum Corporation: Slot Pyrolysis Reactor & Method Of Pyrolysis

4,164,397 Herbert H. Hunt, 3608 Vine Maple, Eugene, Oreg., 97405 & Harold S. Worcester, 91040 Hill Rd., Springfield, Oreg. 97417: Fuel Gas Production

4,165,970 Metallgesellschaft Akteingesellschaft, Germany: Process And Apparatus Gasifying Granular Coal Under Superatmospheric Pressure

4,165,971 Projektierung Chemische Verfahrenstechmik, GmbH Fed. Rep. Of Germany: Apparatus For The Gasification Of Carbonaceous Material

II. C. IN VITRO CONVERSION: PROCESSES INVOLVING SYNTHESIS GAS

1. CONVERSION TO SYNTHESIS GAS

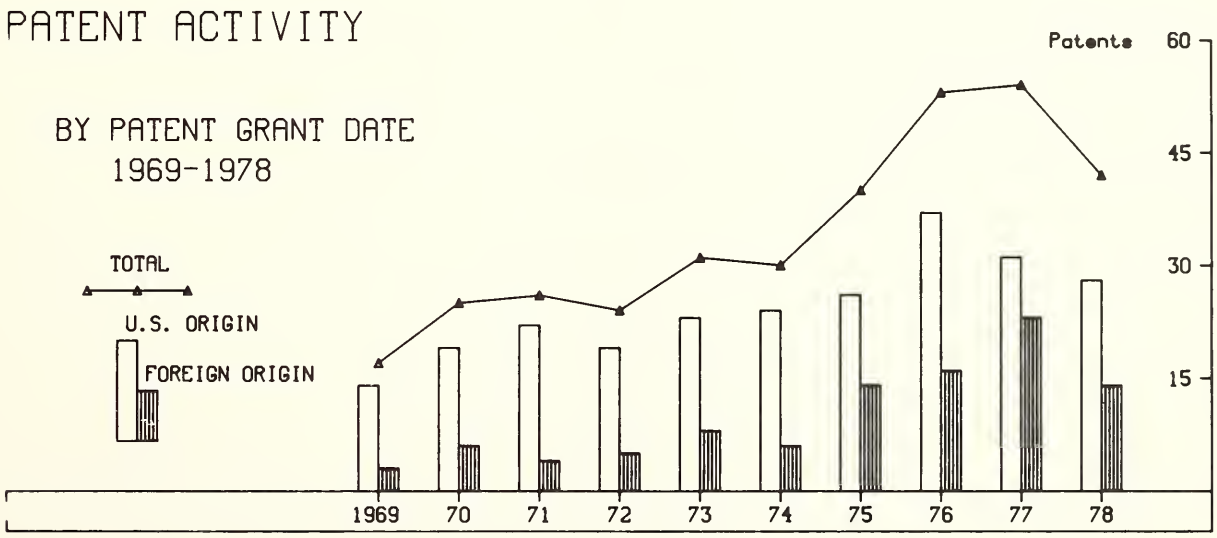
This profile includes processes for conversion of a starting material, including solid carbonaceous material, to synthesis gas, i.e., $CO+H_2$, which may be used as a fuel or as a reactant to make synthetic liquid hydrocarbons (e.g., gasoline) or gaseous hydrocarbons (e.g., fuel gas). Peripheral areas wherein $CO+H_2$ may be produced as an intermediate or by-product have not been included.

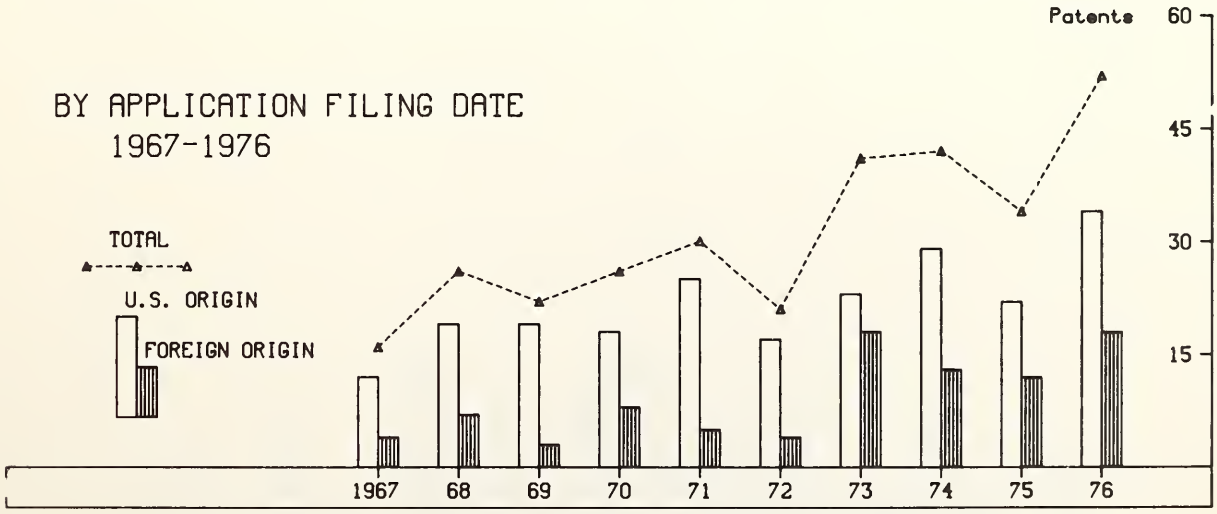
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 252, Subclass 373

ACTIVITY INDICES (1976-1978)

GROWTH	43.6%
FOREIGN SHARE	35.6%
CORPORATE OWNED	90.6%
GOVERNMENT OWNED	4.7%
U.S. OWNED OF FOREIGN	11.3%





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	18	11	9	7	9	17	25	26	24	31	30	40	53	54	42	396
U.S. ORIGIN	14	9	7	6	7	14	19	22	19	23	24	26	37	31	28	286
FOREIGN ORIGIN	4	2	2	1	2	3	6	4	5	8	6	14	16	23	14	110
GERMANY	1	1		1		2	4	1	1	3	1	8	7	11	7	48
JAPAN							1	1		1	1	2	4	7	4	21
UNITED KINGDOM	1	1	1		1		1	2	1		1		2		1	12
NETHERLANDS					1				1			2	3	2	1	10
FRANCE	1		1			1			1	1					1	6
CANADA											2	1				3
SWEDEN	1													1		2
ITALY											1			1		2
MEXICO										2						2
U.S.S.R.										1						1
SWITZERLAND									1							1
AUSTRALIA														1		1
DENMARK												1				1
U.S. ORIGIN	14	9	7	6	7	14	19	22	19	23	24	26	37	31	28	286
U.S. CORP. OWNED	13	8	6	5	5	12	17	20	16	22	23	26	27	28	26	254
U.S. GOVT. OWNED	1							2					6		1	10
U.S. INDIV. OWNED		1	1	1	1	2	2		3	1	1		4	2	1	20
FOREIGN OWNED					1									1		2
FOREIGN ORIGIN	4	2	2	1	2	3	6	4	5	8	6	14	16	23	14	110
U.S. OWNED					1	1	1			2	2	3	3	1	2	16
FOREIGN OWNED	4	2	2	1	1	2	5	4	5	6	4	11	13	22	12	94
FOREIGN CORP.	4	2	2	1	1	2	5	4	4	5	4	11	13	22	12	92
FOREIGN GOVT.																
FOREIGN INDIV.									1	1						2

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

NUMBER OF PATENTED APPLICATIONS

	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	15	11	6	16	26	22	26	30	21	41	42	34	52	16		358
U.S. ORIGIN	12	11	4	12	19	19	18	25	17	23	29	22	34	11		256
FOREIGN ORIGIN	3		2	4	7	3	8	5	4	18	13	12	18	5		102
GERMANY	2		1	2	3	1	3	2	2	6	6	5	9	4		46
JAPAN					2	1				4	4	5	4	1		21
UNITED KINGDOM	1			1	1	1	1			3			1			9
NETHERLANDS			1				1			3	3	1	1			10
FRANCE				1	1			1					1			4
CANADA									2	1						3
SWEDEN													1			1
ITALY								1				1				2
MEXICO							1	1								2
U.S.S.R.							1									1
SWITZERLAND							1									1
AUSTRALIA													1			1
DENMARK										1						1
U.S. ORIGIN	12	11	4	12	19	19	18	25	17	23	29	22	34	11		256
U.S. CORP. OWNED	11	7	4	10	18	18	16	23	16	22	26	15	30	11		227
U.S. GOVT. OWNED		1				1					1	4	2			9
U.S. INDIV. OWNED	1	2		2	1		2	2	1	1	2	3	1			18
FOREIGN OWNED		1											1			2
FOREIGN ORIGIN	3		2	4	7	3	8	5	4	18	13	12	18	5		102
U.S. OWNED	1		1	1		1	1		1	5	3	1		1		16
FOREIGN OWNED	2		1	3	7	2	7	5	3	13	10	11	18	4		86
FOREIGN CORP.	2		1	3	6	2	6	5	3	13	10	11	18	4		84
FOREIGN GOVT.																
FOREIGN INDIV.					1		1									2

II.C. IN VITRO CONVERSION - PROCESSES INVOLVING SYNTHESIS GAS

1. CONVERSION TO SYNTHESIS GAS

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

TEXACO INC.	59
TEXACO DEVELOPMENT CORPORATION	26
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	19
EXXON RESEARCH + ENGINEERING CO.	17
CHEVRON RESEARCH COMPANY	12
SHELL OIL COMPANY	8
PULLMAN, INCORPORATED	7
COGAS DEVELOPMENT COMPANY	5
UNITED TECHNOLOGIES CORPORATION	5
LUMMUS COMPANY	5
GULF OIL CORPORATION	5
JAPAN GASOLINE CO., LTD.	5
BASF AKTIENGESELLSCHAFT	5
PHILLIPS PETROLEUM COMPANY	5
E. I. DU PONT DE NEMOURS AND COMPANY	4
MOBIL OIL CORPORATION	4
TOYO-KOGYO CO., LTD.	4
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	4
IMPERIAL CHEMICAL INDUSTRIES LIMITED	4
ENGELHARD MINERALS + CHEMICALS CORPORATION	3*
DR. C. OTTO COMP. G.M.B.H.	3
RALPH M. PARSONS COMPANY	3
TEXAS INSTRUMENTS, INCORPORATED	3
RUHRCHEMIE AG	3
UNION OIL COMPANY OF CALIFORNIA	3
FLUOR CORPORATION	3
MARATHON OIL COMPANY	2
CHEMICAL CONSTRUCTION CORPORATION	2
GENERAL ELECTRIC COMPANY	2
OCCIDENTAL PETROLEUM CORPORATION	2
GAS COUNCIL	2
HUTTENWERK OBERHAUSEN AG., FIRMA	2
FIERRO ESPONJA S.A.	2
CONTINENTAL OIL COMPANY	2
BETHLEHEM STEEL CORPORATION	2
ROCKWELL INTERNATIONAL CORPORATION	2
UNION CARBIDE CORPORATION	2
INSTITUTE OF GAS TECHNOLOGY	2
NIPPON KOKAN KABUSHIKI KAISHA	2
ALLIED CHEMICAL CORPORATION	2
UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM	2
UNITED STATES OF AMERICA, INTERIOR	2
MIDLAND-ROSS CORPORATION	2
UOP INC.	2

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AIRCO INC.
4106931 - METHODS FOR SINTERING POWDER METALLURGY PARTS

AIR PRODUCTS + CHEMICALS, INC.
3779725 - COAL GASSIFICATION

ALLIED CHEMICAL CORPORATION
4052555 - GASEOUS DIELECTRIC COMPOSITIONS
4089805 - PROCESS FOR PREPARING A GASIFORM HYDROCARBON FUEL FROM HYDROCARBON FUEL OIL

AMERICAN OPTICAL CORPORATION
3825500 - NEODYMIUM GLASS LASER HAVING ROOM TEMPERATURE OUTPUT AT WAVELENGTHS SHORTER THAN 1060 NM

A.P.C. (AZOTE ET PRODUITS CHIMIQUES) CATALYSTS + CHEMICALS E
4089941 - STEAM REFORMER PROCESS FOR THE PRODUCTION OF HYDROGEN

ATLANTIC RICHFIELD COMPANY
3620697 - APPARATUS AND METHOD FOR PRODUCING HYDROGEN

BAMAG VERFAHRENSTECHNIK GMBH
4017272 - PROCESS FOR GASIFYING SOLID CARBONACEOUS FUEL

BASF AKTIENGESELLSCHAFT
3839223 - STEAM REFORMING GASEOUS HYDROCARBONS
3865753 - PROCESS FOR THE PREPARATION OF A NICKEL MAGNESIUM ALUMINUM CATALYST
3912775 - CATALYST AND ITS USE FOR THE MANUFACTURE OF METHANE FROM GASES CONTAINING CARBON MONOXIDE AND DIOXIDE AND HYDROGEN
3928460 - PRODUCTION OF COMBUSTION GAS TO HEAT SILVER CATALYST
3941721 - CATALYST FOR THE MANUFACTURE OF GASES CONTAINING METHANE

BETHLEHEM STEEL CORPORATION
3689575 - METHANOL SYNTHESIS
3872025 - PRODUCTION AND UTILIZATION OF SYNTHESIS GAS

BRAUN, C. F., + COMPANY
3549335 - AUTOTHERMAL REACTOR

BRAYTON CYCLE IMPROVEMENT ASSOCIATON
3882671 - GASIFICATION METHOD WITH FUEL GAS COOLING

BRITISH GAS CORPORATION
3933446 - PROCESS FOR THE PRODUCTION OF A SUBSTITUTE NATURAL GAS

BROKEN HILL PROPRIETARY COMPANY LIMITED
4042344 - PROCESS FOR THE PRODUCTION OF GASEOUS MIXTURES

CAMERON ENGINEERS, INCORPORATED
3963426 - PROCESS FOR GASIFYING CARBONACEOUS MATTER

CATALYSTS AND CHEMICALS INC.
3420618 - GAS PURIFICATION BY HYDROGENATION

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CENTRO SPERIMENTALE METALLURGICO S.P.A.
4048091 - PROCESS FOR THE PREPARATION OF REDUCING GASES

CHEMICAL CONSTRUCTION CORPORATION
3446747 - PROCESS AND APPARATUS FOR REFORMING HYDROCARBONS
3573224 - PRODUCTION OF HYDROGEN-RICH SYNTHESIS GAS

CHEMISCHE WERKE HULS, AG
3925490 - HYDROGENATION CATALYSTS AND PROCESS FOR THE REMOVAL OF ALDEHYDES AND KETONES FROM GASEOUS STREAMS RICH IN CARBON MONOXID
E

CHEM SYSTEMS INC.
3920716 - LIQUID PHASE METHANOL GASIFICATION

CHEVRON RESEARCH COMPANY
3576603 - HYDROGEN MANUFACTURE USING GAS TURBINE DRIVEN CENTRIFUGAL COMPRESSORS
3656905 - HYDROGEN MANUFACTURE
3698881 - SYNTHESIS GAS PRODUCTION
3719749 - HYDROGEN PRODUCTION
3759677 - CATALYTIC SYNTHESIS GAS MANUFACTURE
3765851 - GAS PRODUCTION
3775072 - GAS PRODUCTION
3801708 - HYDROGEN MANUFACTURE USING CENTRIFUGAL COMPRESSORS
3823227 - HYDROGEN MANUFACTURE
3850588 - PRODUCTION OF SYNTHESIS GAS RICH IN CARBON MONOXIDE
3874116 - SYNTHESIS GAS MANUFACTURE
3890432 - CATALYTIC HYDROGEN MANUFACTURE

CITIES SERVICE COMPANY
4040976 - PROCESS OF TREATING CARBONACEOUS MATERIAL WITH CARBON DIOXIDE

COGAS DEVELOPMENT COMPANY
3850839 - MANUFACTURE OF SYNTHESIS GAS
3966633 - WASTE WATER PROCESSING
3966634 - GASIFICATION METHOD
3968052 - SYNTHESIS GAS MANUFACTURE
3993583 - GASIFICATION OF ASH CONTAINING CARBONACEOUS SOLIDS

COMMODITY IMPROVEMENTS INC.
3634051 - ADDITIVES FOR COMBUSTIBLE FUELS

CONTINENTAL OIL COMPANY
3941820 - PREDOMINANTLY ALIPHATIC HYDROCARBON MATERIALS FROM CARBONACEOUS SOLIDS
4120881 - PREDOMINANTLY ALIPHATIC LOWER HYDROCARBON MATERIALS FROM CARBONACEOUS SOLIDS

DAIMLER-BENZ AKTIENGESELLSCHAFT
4067299 - SPLIT-GAS PRODUCTION FOR INTERNAL COMBUSTION ENGINE

DR. C. OTTO COMP. G.M.B.H.
4005045 - METHOD FOR CARRYING OUT ENDOTHERMIC CHEMICAL REACTIONS WITH THE USE OF NUCLEAR REACTOR COOLING GASES
4049570 - METHOD AND APPARATUS FOR REMOVING VAPORS AND AEROSOLS FROM GASES PRODUCED IN A GASIFICATION PLANT
4066420 - PROCESS FOR THE GASIFICATION OF SOLID FUELS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

DYNECOLOGY INCORPORATED
4052173 - SIMULTANEOUS GASIFICATION OF COAL AND PYROLYSIS OF ORGANIC SOLID WASTE MATERIALS

E. I. DU PONT DE NEMOURS AND COMPANY
3502596 - CERAMIC STRUCTURES
3763205 - METHANOL PROCESS WITH RECYCLE
3827987 - REFORMING PROCESS
3943236 - REFORMING PROCESS FOR CARBON MONOXIDE

EISENWERK-GESELLSCHAFT MAXIMILIANSHUTTE MBH
4062657 - METHOD AND APPARATUS FOR DESULPHURIZING IN THE GASIFICATION OF COAL

ENGELHARD INDUSTRIES, INC.
3481722 - PROCESS FOR PRODUCING HYDROGEN

ENGELHARD MINERALS + CHEMICALS CORPORATION
3595805 - STEAM REFORMING WITH PRELIMINARY HYDRODESULFURIZATION
4091086 - PROCESS FOR PRODUCTION OF HYDROGEN

EXXON RESEARCH + ENGINEERING CO.
3440177 - ASH REMOVAL IN GASIFICATION OF CARBONACEOUS SOLIDS
3475160 - METHOD OF PRODUCING FLUIDIZED BED REDUCTION OF ORES
3508873 - HYDROGEN PRODUCED IN AQUEOUS HYDROCARBON EMULSION MULTIBED REACTOR
3542532 - PROCESS FOR THE PRODUCTION OF HYDROGEN FROM PETROLEUM COKE
3615216 - WATER GAS SHIFT PROCESS FOR PRODUCING HYDROGEN USING CESIUM COMPOUND CATALYST
3755556 - LOW TEMPERATURE SHIFT REACTION INVOLVING AN ALKALI METAL COMPOUND AND A HYDROGENATION-DEHYDROGENATION COMPONENT
3816609 - PROCESS FOR PRODUCING A GASEOUS COMPOSITION CONTAINING HYDROGEN OR HYDROGEN AND CARBON OXIDES
3838994 - CONVERSION OF HEAVY HYDROCARBONS TO A METHANE RICH GAS PRODUCT
3847566 - FLUIDIZED BED GASIFICATION PROCESS WITH REDUCTION OF FINES ENTRAINMENT BY UTILIZING A SEPARATE TRANSFER LINE BURNER STAGE
3850742 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIA
3850841 - SHIFT PROCESS FOR NEW CATALYST
3852188 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIA
3876527 - HYDROCARBON CRACKING IN A REGENERABLE MOLTEN MEDIUM
3904744 - PROCESS FOR THE PRODUCTION OF HYDROGEN-CONTAINING GASES
3932146 - PROCESS FOR THE FLUID BED GASIFICATION OF AGGLOMERATING COALS
3985519 - HYDROGASIFICATION PROCESS
4075079 - PROCESS FOR THE PRODUCTION OF HYDROCARBONS FROM COAL

FIERRO ESPONJA S.A.
3765872 - METHOD AND APPARATUS FOR THE GASEOUS REDUCTION OF IRON ORE TO SPONGE IRON
3770421 - METHOD AND APPARATUS FOR CONTROLLING THE COMPOSITION

FIRMA CARL STILL
4050990 - METHOD AND APPARATUS FOR PRODUCING FORM COKE

FLUOR CORPORATION
3743488 - SYNTHESIS GAS GENERATION PROCESS
3795485 - SYNTHESIS GAS GENERATION APPARATUS
3859230 - SYNTHESIS GAS GENERATION WITH CARBON DIOXIDE SUPPLEMENTED FEED

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

FORD, BACON + DAVIS TEXAS, INC.
4051231 - PRODUCTION OF INTERNAL ATMOSPHERES FOR KILNS

FOREST FUELS, INC.
4095958 - APPARATUS AND METHOD FOR PRODUCING COMBUSTIBLE GASES FROM BIOMASS MATERIAL

FRIED KRUPP HUTTENWERKE AG
3923466 - APPARATUS FOR THE PRODUCTION OF CRACKED GAS

GAS COUNCIL
3591356 - PROCESS FOR THE PRODUCTION OF A GAS CONTAINING GASEOUS HYDROCARBONS
3607158 - PROCESS FOR THE HYDROGENATION OF COAL

GENERAL ELECTRIC COMPANY
3541729 - COMPACT REACTOR-BOILER COMBINATION
3607125 - REFORMER TUBE CONSTRUCTION

GENERAL MOTORS CORPORATION
3837905 - THERMAL OXIDATION OF SILICON

GULF OIL CORPORATION
3971635 - COAL GASIFIER HAVING AN ELUTRIATED FEED STREAM
3971636 - CONDENSATE SCRUBBING OF COAL GASIFIER PRODUCT
3971637 - COAL GASIFICATION PROCESS UTILIZING WASTE WATER FROM AN EXTERNAL PROCESS
3971638 - COAL GASIFICATION PROCESS UTILIZING HIGH SULFUR CARBONACEOUS MATERIAL
3971639 - FLUID BED COAL GASIFICATION

HALDOR TOPSOE A/S
3926583 - PROCESS FOR THE CATALYTIC STEAM REFORMING OF HYDROCARBONS

HITACHI, LTD.
4060498 - PROCESS FOR STEAM REFORMING OF HYDROCARBONS

HORIZONS INCORPORATED, A DIVISION OF HORIZONS RESEARCH INCOR
4074980 - PROCESS FOR PRODUCTION OF CARBON MONOXIDE AND HYDROGEN

HUTTENWERK OBERHAUSEN AG., FIRMA
3506590 - MANUFACTURE OF SYNTHESIS-, HYDROGENATING-, OR REDUCTION-GAS
3536455 - PLANT FOR THE PRODUCTION OF METALLURIGICAL REDUCING GAS

HYDROCARBON RESEARCH INC.
3775071 - METHOD FOR FEEDING DRY COAL TO SUPERATOMOSPHERIC PRESSURE

IDEMITSU KOSAN COMPANY LIMITED
4089798 - PROCESS FOR PRODUCING REDUCING GAS

IMPERIAL CHEMICAL INDUSTRIES LIMITED
3488383 - DECOMPOSITION OF FORMIC ACID
3650713 - STEAM REFORMING OF HYDROCARBONS
3961037 - PROCESS FOR FORMING HYDROGEN AND CARBON DIOXIDE USING A CATALYST CONSISTING ESSENTIALLY OF OXIDES OF COPPER, ZINC AND AL UMINUM OR MAGNESIUM
4072625 - STEAM-HYDROCARBON PROCESS

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

INSTITUTE OF GAS TECHNOLOGY
3488171 - REFORMING ANO SELECTIVE METHANATION OF HYOROCARBONS TO GENERATE HYOROGEN
3488226 - PROCESS FOR GENERATION OF HYOROGEN FROM HYOROCARBONS ANO USE THEREOF USE IN MOLTEN CARBONATE FUEL CELLS

JAPAN GASOLINE CO., LTO
3518055 - HYOROCARBON REFORMING PROCESS
3870738 - PROCESS FOR MANUFACTURING GASES RICH IN METHANE
3992166 - LOW TEMPERATURE STEAM REFORMING PROCESS FOR HYOROCARBONS
4000987 - LOW-TEMPERATURE STEAM REFORMING PROCESS FOR HYOROCARBONS
4000988 - LOW-TEMPERATURE STEAM REFORMING PROCESS FOR HYOROCARBONS

KABUSHIKI KAISHA TOYOTA CHUO KENKYUSHO
4087259 - PROCESS FOR PARTIALLY OXIOIZING HYOROCARBONS

LA SOCIETE OITE SOCIETE CHIMIQUE OE LA GRANOE
3644100 - APPARATUS FOR REFORMING HEAVY HYOROCARBONS

LEAS BROTHERS OEVELOPMENT CORPORATION
3801288 - GASIFICATION REACTOR

LINOE AKTIENGESELLSCHAFT
4019314 - HIGH PRESSURE GASIFICATION OF COAL USING NITROGEN OILUTION OF WASTE GAS FROM STEAM GENERATOR

LONZA LTO.
3649189 - PREPARATION OF FINELY PARTICULATE SILICON OXIOES

LUMMUS COMPANY
3475510 - ETHYLENE ANO SYNTHESIS GAS PROCESS
3479298 - PROOUCTION OF HYOROGEN
3524819 - STEAM REFORMING OF HYOROCARBONS
3527565 - STEAM REFORMING OF CARBON MONOXIOE RICH HYOROCARBON FEEOS
3645701 - REFORMER FURNACE

MARATHON OIL COMPANY
3676517 - PROCESS FOR THE PROOUCTION OF SYNTHESIS GAS, CRACKEO HYOROCARBON ANO CALCINEO COKE
3855336 - PROCESS FOR THE PROOUCTION OF SYNTHESIS GAS, CRACKEO HYOROCARBON ANO CALCINEO COAL

MARQUAROT COMPANY
4013428 - COAL GASIFICATION PROCESS

MASCHINENFABRIK AUGSBURG-NURNBERG AKTIENGESELLSCHAFT
3912464 - METHOO OF ANO OEVICE FOR SEPARATING SOLIO COMPONENTS FROM A HOT COMBUSTIBLE GAS GENERATEO IN A REACTOR

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
4113446 - GASIFICATION PROCESS

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3540867 - PROOUCTION OF CARBON MONOXIOE ANO HYOROGEN
3720625 - PROCESS FOR PREPARING HYOROGEN OR NITROGEN ANO HYOROGEN UNOER PRESSURE
3726654 - PROCESS FOR GASIFYING HEAVY HYOROCARBONS
3866353 - PROCESS FOR PROOUCING METHANE-RICH GASES FROM HYOROCARBONS
3897471 - PROCESS FOR PROOUCING METHANOL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

METALLGESELLSCHAFT AKTIENGESELLSCHAFT (CONTINUED)

3959972 - POWER PLANT PROCESS
3962300 - PROCESS FOR PRODUCING METHANOL
3963641 - PROCESS FOR INTERRUPTING NORMAL OPERATION OF A HYDROCARBON GASIFICATION REACTOR
3963642 - PROCESS FOR PRODUCING A REDUCING GAS
3979328 - AUTOMATIC CONTROL FOR PROCESS FOR THERMALLY GASIFYING HYDROCARBONS WITH OXYGEN AND WATER VAPOR
3988425 - PROCESS OF PRODUCING CARBON MONOXIDE FROM LIGHT HYDROCARBONS
4012404 - PROCESS FOR PRODUCING HIGH-METHANE GAS
4031030 - PROCESS FOR TREATING RAW GAS PRODUCED BY THE PRESSURE GASIFICATION OF COAL
4045960 - PROCESS FOR PRODUCING ENERGY
4056483 - PROCESS FOR PRODUCING SYNTHESIS GASES
4071332 - PROCESS OF GASIFYING SOLID FUELS, PARTICULARLY COAL
4087258 - PROCESS FOR PURIFYING RAW GAS FROM THE GASIFICATION OF SOLID FUELS
4087449 - PROCESS FOR PRODUCING METHANOL
4101376 - TUBULAR HEATER FOR CRACKING HYDROCARBONS

MIDLAND-ROSS CORPORATION
3617227 - APPARATUS FOR CATALYTIC REFORMING
3748120 - METHOD OF AND APPARATUS FOR REDUCING IRON OXIDE TO METALLIC IRON

MIFUJI IRON WORKS CO., LTD.
4049395 - METHOD FOR TREATING RAW MATERIAL WITH A TREATING GAS

MITSUBISHI CHEMICAL INDUSTRIES LTD.
3849087 - PROCESS FOR PRODUCING GASES BY THE CONVERSION OF HYDROCARBONS

MOBIL OIL CORPORATION
3972958 - CONVERSION OF COAL TO HIGH OCTANE GASOLINE
4046522 - PRE-ENGINE CONVERTER FOR USE WITH FUELS CONTAINING OXYGENATED COMPOUNDS
4093029 - UTILIZATION OF LOW BTU NATURAL GAS
4098339 - UTILIZATION OF LOW BTU NATURAL GAS

MONSANTO COMPANY
3761579 - HYDROGEN IODIDE

NIPPON KOKAN KABUSHIKI KAISHA
3909446 - METHOD OF MANUFACTURING HIGH QUALITY REDUCING GAS BY TWO STAGE REFORMING PROCESSES
4005986 - DEVICE FOR MAKING HIGH TEMPERATURE REFORMED GAS

NIPPON SOKEN, INC.
4110256 - CATALYST FOR REFORMING FUEL AND METHOD FOR PRODUCING SAME

NIPPON STEEL CORPORATION
3947234 - METHOD OF RAISING THE TEMPERATURE OF REDUCING GAS CONTAINING CO COMPONENT

NISSAN MOTOR CO., LTD.
4088450 - HYDROGEN GENERATOR

OCCIDENTAL PETROLEUM CORPORATION
3698882 - CONTINUOUS PROCESS FOR THE CONVERSION OF CARBONACEOUS SOLIDS INTO PIPELINE GAS
3846096 - GASIFICATION OF CARBONACEOUS SOLIDS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

OTTO CONSTRUCTION CORPORATION
3427253 - METHOD FOR PRODUCING CARBON MONOXIDE AND HYDROGEN FROM COAL DISTILLATION GAS

PHILLIPS PETROLEUM COMPANY
3552924 - HYDROGEN MANUFACTURE
4011058 - PRODUCTION OF SUBSTITUTE NATURAL GAS FROM GASIFICATION OF COAL CHAR
4070160 - GASIFICATION PROCESS WITH ZINC CONDENSATION ON THE CARBON SOURCE
4071331 - PROCESS FOR PRODUCING METHANE FROM CARBON MONOXIDE AND STEAM
4073630 - PRODUCTION OF CARBON MONOXIDE

PRITCHARD, J. F., AND COMPANY
3501516 - METHOD FOR PRODUCTION OF METHANOL

PULLMAN, INCORPORATED
3567411 - PROCESS FOR THE PRODUCTION OF GASEOUS PRODUCT CONTAINING HYDROGEN AND METHANE
3567412 - GASIFICATION OF CARBONACEOUS FUELS
3771261 - PROCESS FOR MAKING FUEL GAS
3828474 - PROCESS FOR PRODUCING HIGH STRENGTH REDUCING GAS
3862899 - PROCESS FOR THE PRODUCTION OF SYNTHESIS GAS AND CLEAN FUELS
4026823 - HYDROCARBON REFORMING CATALYST AND METHOD FOR PREPARING SAME
4079017 - PARALLEL STEAM REFORMERS TO PROVIDE LOW ENERGY PROCESS

RALPH M. PARSONS COMPANY
3999961 - SULFUR CONTROL OVER CARBON FORMATION IN HIGH TEMPERATURE REFORMING OPERATIONS
4050908 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM COAL
4104191 - HYDROGEN GENERATION FROM FLUE GASES

ROCKWELL INTERNATIONAL CORPORATION
3916617 - PROCESS FOR PRODUCTION OF LOW BTU GAS
4017271 - PROCESS FOR PRODUCTION OF SYNTHESIS GAS

RUHRCHEMIE AG
3578423 - PROCESS FOR CATALYTICALLY SPLITTING ISOBUTYRALDEHYDE TO PRODUCE CARBON MONOXIDE AND HYDROGEN
4039584 - CATALYTIC CLEAVAGE OF ISOBUTYRALDEHYDE
4048233 - PROCESS FOR PREPARING A SYNTHESIS GAS SUITABLE AS STARTING MATERIAL FOR THE OXO-SYNTHESIS

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
4060397 - TWO STAGE PARTIAL COMBUSTION PROCESS FOR SOLID CARBONACEOUS FUELS

SHELL OIL COMPANY
3810975 - START-UP PROCEDURE FOR CATALYTIC STEAM REFORMING OF HYDROCARBONS
3868331 - PROCESS FOR THE PARTIAL COMBUSTION OF HYDROCARBONACEOUS FUELS TO PRODUCE SUBSTANTIALLY SOOT-FREE GASES
3917468 - SYNTHETIC NATURAL GAS PRODUCTION
3957962 - PROCESS FOR THE PREPARATION OF HYDROGEN-RICH GAS
3964882 - PARTIAL COMBUSTION PROCESS
3972690 - GASIFICATION PROCESS
4007129 - PARTIAL COMBUSTION PROCESS FOR MANUFACTURING A PURIFIED GAS CONTAINING HYDROGEN AND CARBON MONOXIDE
4094813 - PROCESS AND APPARATUS FOR THE MANUFACTURE AND COOLING OF GASES CONTAINING HYDROGEN AND CARBON MONOXIDE

SIEMENS AKTIENGESELLSCHAFT
3454364 - USE OF RANEY NICKEL FOR OBTAINING HYDROGEN

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SNAM PROGETTI S.P.A.
3813229 - PROCESS FOR THE PRODUCTION OF A REDUCING GAS FOR BLAST FURNACE

SOCIETE ANONYME SOCIETE TECHNIQUE D ENTREPRISES CHEMIQUES
3486327 - PROCESS FOR TREATING GASEOUS MIXTURES

SOCIETE CHIMIQUE DE LA GRANDE PAROISSE,
3737291 - PROCESS FOR REFORMING HEAVY HYDROCARBONS

STAMICARBON N.V.
3687866 - PROCESS OF PREPARING SYNTHESIS GAS

STONE + WEBSTER ENGINEERING CORPORATION
3958951 - CONVECTIVE POWER REFORMER EQUIPMENT AND SYSTEM

STORA KOPPARBERGS BERGSLAGS AB
4026679 - APPARATUS FOR AND PROCESS OF CONVERTING CARBONACEOUS MATERIALS CONTAINING SULPHUR TO AN ESSENTIALLY SULPHUR-FREE COMBUST IBLE GAS

SUN RESEARCH AND DEVELOPMENT COMPANY
3770399 - COAL GASIFICATION PROCESS

TEXACO DEVELOPMENT CORPORATION
3551347 - OXIDATION PROCESS WITH IMPROVED WASTE HEAT BOILER
3620699 - REDUCING GAS GENERATION
3705108 - SYNTHESIS GAS GENERATION
3723344 - OXO-SYNTHESIS GAS
3723345 - SYNTHESIS GAS PROCESS
3738940 - METHOD OF OPERATING A BURNER FOR THE PARTIAL OXIDATION OF HYDROCARBONS TO SYNTHESIS GAS
3743606 - SYNTHESIS GAS GENERATION
3767379 - ORE REDUCTION PROCESS USING RECIRCULATED COOLANT GAS
3816332 - SYNTHESIS GAS PRODUCTION
3847564 - APPARATUS AND PROCESS FOR BURNING LIQUID HYDROCARBONS IN A SYNTHESIS GAS GENERATOR
3907703 - PROCESS FOR PRODUCING REDUCING GAS
3919113 - OXO-SYNTHESIS GAS
3919114 - SYNTHESIS GAS PROCESS
3920717 - PRODUCTION OF METHANOL
3922148 - PRODUCTION OF METHANE-RICH GAS
3945942 - FUEL BURNER AND PROCESS FOR GAS MANUFACTURE
3980590 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980591 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980592 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4016102 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4016103 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4016104 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4081253 - PRODUCTION OF PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE
4099932 - CONVERSION OF SOLID FUELS TO FLUID FUELS
4110359 - PRODUCTION OF CLEANED AND PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE
4113445 - PROCESS FOR THE PARTIAL OXIDATION OF LIQUID HYDROCARBONACEOUS FUELS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC.

3473903 - RECOVERY OF CARBON FROM SYNTHESIS GAS
3485882 - STEAM-HYDROCARBON PROCESS OVER IRON-CHROMIUM CATALYST FOR SYNTHESIS GAS PRODUCTION
3520823 - SYNTHESIS GAS PROCESS
3528930 - PRODUCTION OF SYNTHESIS GAS
3544291 - COAL GASIFICATION PROCESS
3545926 - PRODUCTION OF SYNTHESIS GAS AND HYDROGEN
3556751 - PRODUCTION OF SYNTHESIS GAS
3574578 - STEAM HYDROCARBON REFORMING PROCESS
3595619 - SHIFT CONVERSION PROCESS FOR PRODUCTION OF HYDROGEN
3607156 - HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS
3607157 - SYNTHESIS GAS FROM PETROLEUM COKE
3615297 - CARBON RECOVERY PROCESS
3620698 - HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS
3620700 - RECOVERY OF ENTRAINED CARBON IN SYNTHESIS GAS
3639261 - PROCESS FOR THE GENERATION OF SYNTHESIS GAS FROM OIL
3652454 - HIGH PRESSURE WATER-GAS SHIFT CONVERSION PROCESS
3666423 - HEAT EXCHANGE APPARATUS
3666682 - WATER-GAS SHIFT CONVERSION PROCESS
3694373 - PRODUCTION DF REDUCING GAS
3709669 - METHANE PRODUCTION
3725270 - POLLUTION ABATEMENT PROCESS FOR REFINERY WASTE WATER
3740204 - PROCESS FOR THE PRODUCTION OF METHANE FROM CARBONACEOUS FUELS
3752771 - SYNTHESIS GAS PRODUCTION BY PARTIAL OXIDATION
3759837 - SYNTHESIS GAS PRODUCTION BY PARTIAL OXIDATION
3764547 - SLURRIES OF SOLID CARBONIFEROUS FUELS
3784364 - PRODUCTION OF FUEL GAS
3796547 - HEAT EXCHANGE APPARATUS FOR CATALYTIC SYSTEM
3825501 - EXOTHERMIC REACTION PROCESS
3840355 - PARTIAL OXIDATION OF HYDROCARBONS TO SYNTHESIS GAS
3846095 - REDUCING GAS GENERATION
3866411 - GAS TURBINE PROCESS UTILIZING PURIFIED FUEL AND RECIRCULATED FLUE GASES
3868817 - GAS TURBINE PROCESS UTILIZING PURIFIED FUEL GAS
3884648 - PROCESS FOR MAKING A REDUCING GAS
3890113 - PRODUCTION OF METHANE
3920579 - SYNTHESIS GAS PRODUCTION BY PARTIAL OXIDATION
3927997 - METHANE-RICH GAS PROCESS
3927998 - PRODUCTION OF METHANE-RICH GAS STREAM
3927999 - METHANE-RICH GAS PROCESS
3928000 - PRODUCTION OF A CLEAN METHANE-RICH FUEL GAS FROM HIGH-SULFUR CONTAINING HYDROCARBONACEOUS MATERIALS
3928001 - PRODUCTION OF METHANE
3929429 - FUEL GAS FROM SOLID CARBONACEOUS FUELS
3951617 - PRODUCTION OF CLEAN FUEL GAS
3957682 - PREPARATION OF METHANE, HYDROGEN AND CARBON MONOXIDE CONTAINING GASES
3976442 - SYNTHESIS GAS FROM GASEOUS CO/2\ -SOLID CARBONACEOUS FUEL FEEDS
3976443 - SYNTHESIS GAS FROM SOLID CARBONACEOUS FUEL
3996026 - PROCESS FOR FEEDING A HIGH SOLIDS CONTENT SOLID FUEL-WATER SLURRY TO A GASIFIER
3998609 - SYNTHESIS GAS GENERATION
4006099 - MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYDROGEN AND CARBON MONOXIDE
4006100 - MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYDROGEN AND CARBON MONOXIDE
4007015 - APPARATUS USEFUL FOR THE PRODUCTION OF HYDROGEN
4007018 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS
4007019 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING
(CONTINUED)

TEXACO INC.
4021366 - PRODUCTION OF HYDROGEN-RICH GAS
4046869 - STEAM REFORMING PROCESS
4074981 - PARTIAL OXIDATION PROCESS
4083799 - METHOD OF STEAM REFORMING
4099382 - BY-PRODUCT SUPERHEATED STEAM FROM THE PARTIAL OXIDATION PROCESS
4099383 - PARTIAL OXIDATION PROCESS
4121912 - PARTIAL OXIDATION PROCESS WITH PRODUCTION OF POWER

TEXAS INSTRUMENTS, INCORPORATED
3505018 - REFORMING HYDROCARBON FUELS
3619144 - APPARATUS FOR REFORMING HYDROCARBON FUELS TO PRODUCE HYDROGEN
3685977 - PARTIAL OXIDATION OF HYDROCARBONS

THAGARD TECHNOLOGY COMPANY
4059416 - CHEMICAL REACTION PROCESS UTILIZING FLUID-WALL REACTORS

TOHOKU UNIVERSITY
4005995 - PROCESS FOR PRODUCING A GASEOUS PRODUCT FROM CARBONACEOUS MATERIAL

TOTAL ENERGY CORPORATION
3692506 - HIGH BTU GAS CONTENT FROM COAL

TOYO-KOGYO CO., LTD.
3582296 - GASIFYING PROCESS
3953356 - METHOD OF PRODUCING GASEOUS MIXTURE RICH IN HYDROGEN
3957681 - PROCESS FOR MANUFACTURING GASEOUS MIXTURES RICH IN HYDROGEN
4025457 - PROCESS FOR MANUFACTURING GASEOUS MIXTURES RICH IN HYDROGEN

UNION CARBIDE CORPORATION
4017273 - PYROLYSIS PROCESS FOR CONVERTING REFUSE TO FUEL GAS
4042345 - PROCESS FOR CONVERSION OF SOLID REFUSE TO FUEL GAS USING PELLETIZED REFUSE FEED

UNION OIL COMPANY OF CALIFORNIA
3539298 - PRODUCTION OF HYDROGEN FROM CARBON MONOXIDE AND WATER UNDER LIQUID PHASE REACTION CONDITIONS IN THE PRESENCE OF A BASIC NITROGEN COMPOUND
4024171 - ALUMINUM BORATE CATALYST COMPOSITIONS AND USE THEREOF IN CHEMICAL CONVERSIONS
4124629 - THERMALLY STABLE COPRECIPITATED CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS

UNION RHEINISCHE BRAUNKOHLEN KRAFFSTOFF AKTIENGESELLSCHAFT
3690550 - PROCESS FOR TRANSPORTING THERMAL ENERGY

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3945809 - METHOD AND APPARATUS FOR REMOVING COARSE UNENTRAINED CHAR PARTICLES FROM THE SECOND STAGE OF A TWO-STAGE COAL GASIFIER
3988123 - GASIFICATION OF CARBONACEOUS SOLIDS
3989480 - DECOMPOSITION OF CARBOHYDRATE WASTES
3993458 - METHOD FOR PRODUCING SYNTHETIC FUELS FROM SOLID WASTE

UNITED STATES OF AMERICA, INTERIOR
3594329 - REGENERATION OF ZINC CHLORIDE CATALYST
4087373 - NOVEL METHOD FOR THE PRODUCTION OF HYDROGEN AND HYDROGEN-CARBON MONOXIDE MIXTURES

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM
3971847 - HYDROGEN-RICH GAS GENERATOR
3982910 - HYDROGEN-RICH GAS GENERATOR

UNITED STATES OF AMERICA, NAVY
3553273 - BIS(FLUORODINITROMETHYL)ALKYLENE DIOLS

UNITED STATES STEEL CORPORATION
4047935 - PROCESS FOR DIRECT-REDUCTION OF IRON-ORE EMPLOYING NUCLEAR REACTOR-POWDERED CATALYTIC REFORMER

UNITED TECHNOLOGIES CORPORATION
3442618 - METHOD FOR PRODUCING HYDROGEN FROM HYDROGEN- CONTAINING FEEDSTOCKS
3446594 - METHOD FOR GENERATING HYDROGEN-CONTAINING FEEDSTOCKS
3450500 - METHOD FOR CATALYTICALLY REFORMING HYDROGEN-CONTAIN- ING CARBONACEOUS FEEDSTOCKS BY SIMULTANEOUS ABSTRAC- TIONS THROUGH A MEMBRANE SELECTIVELY PERMEABLE TO HYDROGEN
3531263 - INTEGRATED REFORMER UNIT
4071330 - STEAM REFORMING PROCESS AND APPARATUS THEREFOR

UNIVERSITY OF ILLINOIS FOUNDATION
4004896 - PRODUCTION OF WATER GAS

UNIVERSITY OF ROCHESTER
4107076 - CATALYST SYSTEM FOR CATALYZING THE WATER GAS SHIFT REACTION

UOP INC.
3859428 - PRODUCTION OF HYDROGEN
4010008 - SUBSTITUTED NATURAL GAS VIA HYDROCARBON STEAM REFORMING

WESTINGHOUSE ELECTRIC CORP.
4021298 - CONVERSION OF COAL INTO HYDROCARBONS

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
CAUGHEY	ROBERT	A.	CLINTON ROAD	ANTRIM	NH	03440
4030895 - APPARATUS FOR PRODUCING COMBUSTIBLE GASES FROM CARBONACEOUS MATERIALS						
CROUCH	WILLIAM	B.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
ERICKSON	DONALD	C.	1704 S. HARBOR LA.	ANNAPOLIS	MD	21401
4126668 - PRODUCTION OF HYDROGEN RICH GAS BY COMBINED STEAM REFORMING AND INTERMEDIATE OXIDATION-REDUCTION						
ESTABROOK	LAWRENCE	E.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
FUNK	HARALD	F.	68 ELM ST.	MURRAY HILL	NJ	07974
3970524 - TREATING WASTE MATERIALS TO PRODUCE USABLE GASES						
RICHTER	GEORGE	N.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
SLATER	WILLIAM	L.	C/O TEXACO INC. P.O. BOX 400	MONTEBELLO	CA	90640
4007017 - PRODUCTION OF CLEAN SYNTHESIS OR FUEL GAS						
SQUIRES	ARTHUR	M.	245 W. 104 ST.	NEW YORK	NY	10025
3957457 - GASIFYING COAL OR COKE AND DISCHARGING ASH AGGLOMERATES						
3957458 - GASIFYING COAL OR COKE AND DISCHARGING SLAG FRIT						
VAN SLYKE	WILLIAM	J.	2549 HARRIS AVE.	RICHLAND	WA	99352
3977844 - PROCESS FOR PRODUCING A SULFUR FREE COMBUSTIBLE GAS						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3424695 - IMPROVING REFORMER-FURNACE PERFORMANCE BY USING GAS-TURBINE EXHAUST
3469944 - PROCESS AND APPARATUS FOR THE MANUFACTURE OF HYDROGEN
3515514 - PRODUCTION OF HYDROGEN CONTAINING GASES
3519546 - METHOD OF INCREASING THE ACTIVITY OF A CATALYST IN THE OXIDATION OF CARBON MONOXIDE
3655172 - SATURATED FLUID MIXTURES GENERATOR
3684689 - PROCESS FOR PRODUCING LIGHT PRODUCTS FROM HEAVY HYDROCARBONS
3687646 - SEWAGE DISPOSAL PROCESS
3688438 - PRODUCTION OF A METHANE-RICH SYNTHESIS GAS
3715195 - MULTI-HYDROTORTING OF COAL
3751228 - APPARATUS FOR REFORMING HYDROCARBONS UNDER PRESSURE
3850840 - WATER GAS SHIFT PROCESS

3071453	3072469	3073672	3088919	3090684	3091593	3094391	3097081	3097082	3103423	3115394	3119667
3132010	3136623	3136624	3136625	3147093	3148508	3173784	3177150	3179500	3189438	3193378	3197293
3206334	3208830	3214236	3214266	3222132	3232726	3232727	3232728	3241933	3250601	3262758	3264066
3271325	3278268	3303017	3305312	3312634	3317275	3343908	3345136	3351563	3379505	3387942	3388074
3393979	3394086	3395004	3397962	3410661	3418082						

II.C. IN VITRO CONVERSION: PROCESSES INVOLVING SYNTHESIS GAS
1. CONVERSION TO SYNTHESIS GAS

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,134,740	Texaco Inc.: Method For Energy Utilization In Producing Synthesis Gas And Recovering Unconverted Carbon
4,140,493	Phillips Petroleum Company: Hydrocarbon Steam Reforming Process
4,141,695	Texaco, Inc.: Process For Gas Cleaning With Reclaimed Water
4,141,696	Texaco, Inc.: Process For Gas Cleaning With Reclaimed Water And Apparatus For Water Reclamation
4,142,988	Imperial Chemical Industries Ltd: Carbon Monoxide Shift Process
4,146,369	Projektierung Chemische Verfahrenstechnik GmbH: Process For Gas Production From Solid Fuels
4,147,660	Osaka Gas Company, Ltd.: Method For Reactivation Of Platinum Group Metal Catalyst With Aqueous Alkaline And/Or Reducing Solutions
4,149,859	Shell Internaltionale Research Maatchappij B.V.: Process For Cooling And Separation Of Dry Particulate Matter From A Hot Gas
4,151,107	Monsanto Company: Catalysis Of Water- Gas Shift Reaction
4,152,119	Dynecology Inc.: Briquette Comprising Caking Coal And Municipal Solid Waste
4,153,580	United Catalysts Inc.: CO-Conversion Catalysts
4,154,582	General Electric Company: Method Of Solids Discharge From Coal Gasifier Grate
4,156,659	United States Steel Corporation: Method Of Manufacturing A Reducing Gas Useful In A Direct Reduction Process
4,161,393	Metallgesellschaft Aktiengsellschaft: Shift Conversion Of Raw Gas From Gasification of Coal
4,161,510	Chevron Research Company: Reforming Furnace Having Ceramic Coated Tubes
4,166,101	Emmamuel E. A. Neel; Michael Deflin; Jacques Vanrenterghem & Jean Claude Clement all of Grand Courrone, France: Process Of The Preparation Of A Hydrogen-Rich Gas And The Catalyst Used In The Process

II. C. IN VITRO CONVERSION: PROCESSES INVOLVING SYNTHESIS GAS

2. REACTING SYNTHESIS GAS

This profile includes processes which are directed to the reaction of CO and/or CO_2 with H_2, i.e., the reaction of synthesis gas, to form one or more carbon compounds, such as, gaseous hydrocarbons (methanization), or liquid hydrocarbons ("Fischer-Tropsch" synthesis) or oxygenated compounds (methanol). Processes may also include the conversion of a starting material to synthesis gas as a first step.

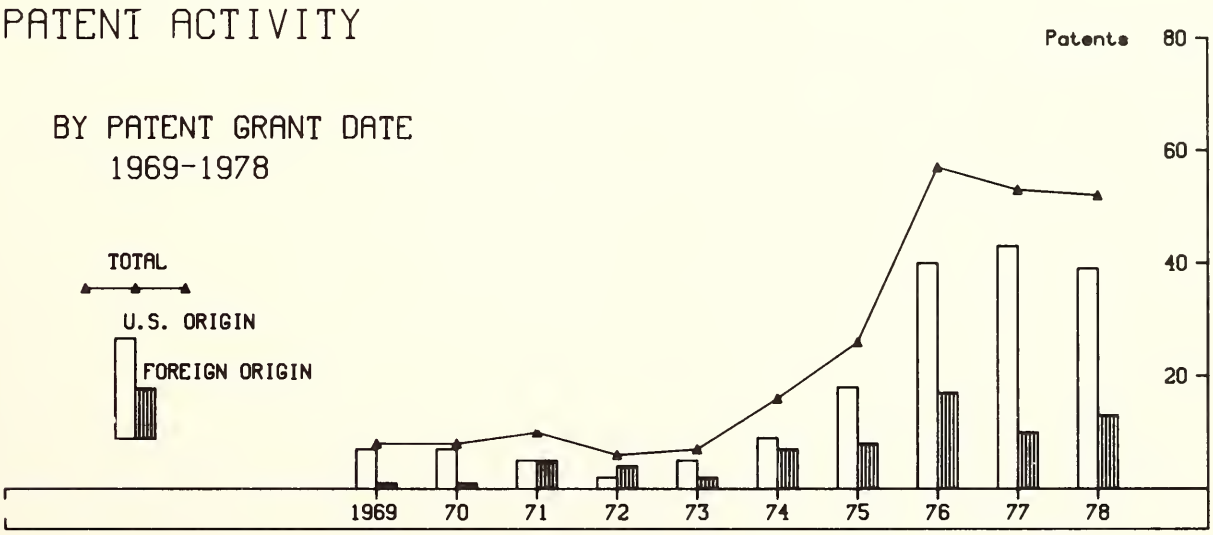
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

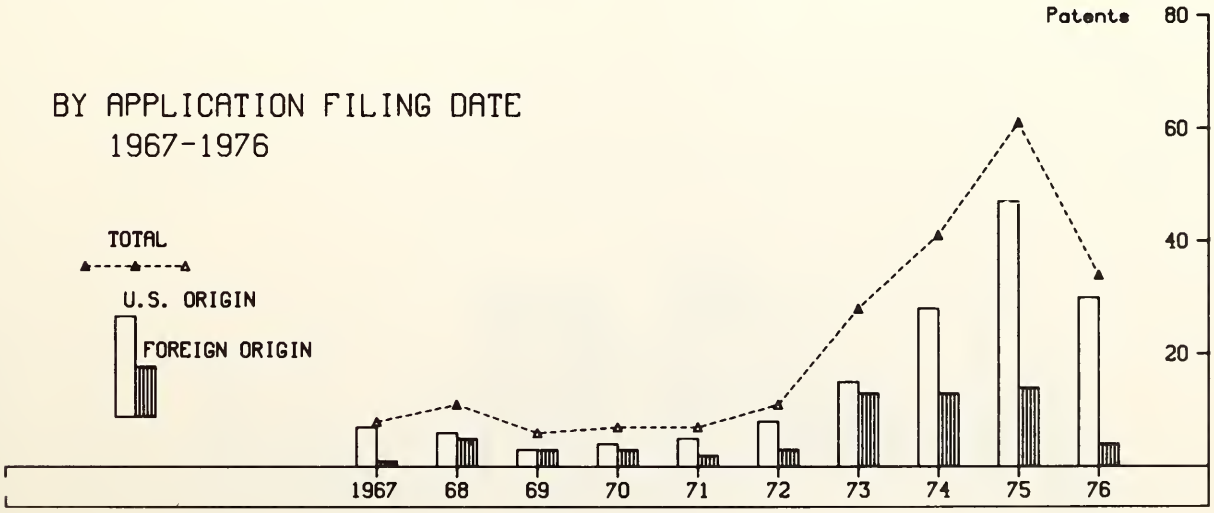
Class 260, Subclasses 449L-450

ACTIVITY INDICES (1976-1978)

GROWTH	66.7%
FOREIGN SHARE	24.7%
CORPORATE OWNED	95.1%
GOVERNMENT OWNED	3.1%
U.S. OWNED OF FOREIGN	2.5%

PATENT ACTIVITY





PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	5	2	7	6	8	8	8	10	6	7	16	26	57	53	52	271
U.S. ORIGIN	2	2	6	3	6	7	7	5	2	5	9	18	40	43	39	194
FOREIGN ORIGIN	3		1	3	2	1	1	5	4	2	7	8	17	10	13	77
GERMANY	2			2					1		1	4	7	6	4	27
UNITED KINGDOM	1			1		1	1	3	2		1		7	4	1	22
JAPAN			1		1			1	1		4	2	2			12
FRANCE												1			4	5
ITALY								1		1					1	3
DENMARK					1								1		1	3
U.S.S.R.										1					1	2
NETHERLANDS												1				1
RHODESIA															1	1
CANADA											1					1
U.S. ORIGIN	2	2	6	3	6	7	7	5	2	5	9	18	40	43	39	194
U.S. CORP. OWNED	1	2	5	3	5	6	7	5	2	5	7	15	35	42	38	178
U.S. GOVT. OWNED			1			1					2	1	4		1	10
U.S. INDIV. OWNED	1											1	1	1		4
FOREIGN OWNED					1							1				2
FOREIGN ORIGIN	3		1	3	2	1	1	5	4	2	7	8	17	10	13	77
U.S. OWNED	1							1			1	1	1			5
FOREIGN OWNED	2		1	3	2	1	1	4	4	2	6	7	16	10	13	72
FOREIGN CORP.	1		1	3	2	1	1	2	3	1	6	6	16	10	12	65
FOREIGN GOVT.								1								1
FOREIGN INDI '.	1							1	1	1		1			1	6

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	7	8	4	8	11	6	7	7	11	28	41	61	34	24		257
U.S. ORIGIN	5	5	3	7	6	3	4	5	8	15	28	47	30	18		184
FOREIGN ORIGIN	2	3	1	1	5	3	3	2	3	13	13	14	4	6		73
GERMANY		2			1				2	4	5	7	2	2		25
UNITED KINGDOM	1	1		1	2	2	1		1	2	5	4	1			21
JAPAN			1		1	1		2		5	1					11
FRANCE											1		1	3		5
ITALY					1		1					1				3
DENMARK	1											2				3
U.S.S.R.							1							1		2
NETHERLANDS										1						1
RHODESIA											1					1
CANADA										1						1
U.S. ORIGIN	5	5	3	7	6	3	4	5	8	15	28	47	30	18		184
U.S. CORP. OWNED	5	3	3	7	6	3	4	5	5	13	26	43	30	17		170
U.S. GOVT. OWNED		1							2	1	1	3		1		9
U.S. INDIV. OWNED									1	1		1				3
FOREIGN OWNED		1									1					2
FOREIGN ORIGIN	2	3	1	1	5	3	3	2	3	13	13	14	4	6		73
U.S. OWNED					1				1	2						4
FOREIGN OWNED	2	3	1	1	4	3	3	2	2	11	13	14	4	6		69
FOREIGN CORP.	2	3	1	1	1	3	2	2	2	11	12	14	4	5		63
FOREIGN GOVT.					1											1
FOREIGN INDIV.					2		1				1			1		5

II.C. IN VITRO CONVERSION - PROCESSES INVOLVING SYNTHESIS GAS
2. REACTING SYNTHESIS GAS

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

MOBIL OIL CORPORATION	32*
UNION CARBIDE CORPORATION	18
EXXON RESEARCH + ENGINEERING CO.	13
METALLGESELLSCHAFT AKTIENGESELLSCHAFT	10
IMPERIAL CHEMICAL INDUSTRIES LIMITED	10
TEXACO INC.	9
UNION OIL COMPANY OF CALIFORNIA	8
TEXACO DEVELOPMENT CORPORATION	7
SHELL OIL COMPANY	7
CONTINENTAL OIL COMPANY	6
PHILLIPS PETROLEUM COMPANY	6
BASF AKTIENGESELLSCHAFT	4
CHEVRON RESEARCH COMPANY	4
GULF RESEARCH + DEVELOPMENT COMPANY	4
GAS COUNCIL	4
UNITED STATES OF AMERICA, INTERIOR	4
MONSANTO COMPANY	4
RALPH M. PARSONS COMPANY	4*
PULLMAN, INCORPORATED	3
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	3
CHEM SYSTEMS INC.	3
KRUPP KOPPERS GMBH	3
BRITISH GAS CORPORATION	3
MITSUBISHI GAS-CHEMICAL COMPANY, INC.	3
BATTELLE DEVELOPMENT CORPORATION	3
E. I. DU PONT DE NEMOURS AND COMPANY	3
INSTITUTE OF GAS TECHNOLOGY	2
ETHYL CORPORATION	2
HALDOR TOPSOE A/S	2
CLEANESE CORPORATION	2
CHEMICAL CONSTRUCTION CORPORATION	2
UOP INC.	2
BETHLEHEM STEEL CORPORATION	2
SAGAMI CHEMICAL RESEARCH CENTER	2
INSTITUT FRANCAIS DU PETROLE DES CARBURANTS ET LUBRIFIANTS A	2
JAPAN GASOLINE CO., LTD.	2

*Composite total, see Appendix A.

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

AIR PRODUCTS + CHEMICALS, INC.
4131568 - CATALYTIC SYNTHESIS OF LOW MOLECULAR WEIGHT HYDROCARBONS

AJINOMOTO CO., INC.
3816513 - PROCESS FOR PRODUCING METHYL FORMATE

ARMOUR PHARMACEUTICAL COMPANY
3499963 - CODRIED ALUMINUM HYDROXIDE-ALUMINUM CHELATE ANTACID

BASF AKTIENGESELLSCHAFT
3865753 - PROCESS FOR THE PREPARATION OF A NICKEL MAGNESIUM ALUMINUM CATALYST
3912775 - CATALYST AND ITS USE FOR THE MANUFACTURE OF METHANE FROM GASES CONTAINING CARBON MONOXIDE AND DIOXIDE AND HYDROGEN
3941721 - CATALYST FOR THE MANUFACTURE OF GASES CONTAINING METHANE
3950368 - MANUFACTURE OF METHANE

BATTELLE DEVELOPMENT CORPORATION
3997582 - PROCESS AND CATALYST FOR SYNTHESIZING A GASEOUS HYDROCARBON MIXTURE HAVING A HIGH METHANE CONTENT FROM CARBON MONOXIDE A ND HYDROGEN
4039302 - PROCESS AND CATALYST FOR SYNTHESIZING LOW BOILING (C1 TO C3) ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN
4077995 - PROCESS FOR SYNTHESIZING LOW BOILING ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN

BECHTEL ASSOCIATES PROFESSIONAL CORPORATION
4017274 - PROCESS FOR THE METHANATION OF GASES CONTAINING HIGH CONCENTRATION OF CARBON MONOXIDE

BETHLEHEM STEEL CORPORATION
3689575 - METHANOL SYNTHESIS
3872025 - PRODUCTION AND UTILIZATION OF SYNTHESIS GAS

BRITISH GAS CORPORATION
3933446 - PROCESS FOR THE PRODUCTION OF A SUBSTITUTE NATURAL GAS
3942958 - COMPOSITION CONTROL OF GASES
4105591 - METHOD OF PREPARING AND FILTERING COPRECIPITATED NICKEL-ALUMINA CATALYSTS

CATALYSTS AND CHEMICALS INC.
3549556 - SPHERICAL METHANATION CATALYSTS

CELANESE CORPORATION
4089886 - METHANOL PURIFICATION
4101450 - CATALYST FOR PRODUCTION OF ACETIC ACID

CHEMICAL CONSTRUCTION CORPORATION
3446747 - PROCESS AND APPARATUS FOR REFORMING HYDROCARBONS
3531266 - PRODUCTION OF SYNTHETIC METHANOL

CHEM SYSTEMS INC.
3888896 - METHANOL PRODUCTION
3920716 - LIQUID PHASE METHANOL GASIFICATION
4031123 - METHANOL PRODUCTION IN A PARAFFINIC MEDIUM

CHEVRON RESEARCH COMPANY
3907519 - GASIFICATION OF SOLID CARBONACEOUS MATERIALS TO OBTAIN HIGH BTU PRODUCT GAS
3986349 - METHOD OF POWER GENERATION VIA COAL GASIFICATION AND LIQUID HYDROCARBON SYNTHESIS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

CHEVRON RESEARCH COMPANY (CONTINUED)
4087470 - PROCESS FOR THE PRODUCTION OF ETHYLENE GLYCOL
4092825 - PROCESS FOR BASE-LOAD AND PEAK-LOAD POWER GENERATION

CONOCO METHANATION COMPANY
4127392 - METHANATION PROCESS START-UP

CONTINENTAL OIL COMPANY
3932552 - INTEGRATED PROCESS FOR PRODUCING C/2 \ HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN
3941820 - PREDOMINANTLY ALIPHATIC HYDROCARBON MATERIALS FROM CARBONACEOUS SOLIDS
3965045 - IRON CATALYST
3977843 - PURIFICATION PROCESS FOR COAL GAS METHANATION
4120881 - PREDOMINANTLY ALIPHATIC LOWER HYDROCARBON MATERIALS FROM CARBONACEOUS SOLIDS
4123448 - ADIABATIC REACTOR

DAVY POWERGAS LIMITED
3930812 - METHANE SYNTHESIS

E. I. DU PONT DE NEMOURS AND COMPANY
3763205 - METHANOL PROCESS WITH RECYCLE
4111847 - METHANOL SYNTHESIS CATALYST
4131616 - METHANATION CATALYST

ELECTRICITE DE FRANCE SERVICE NATIONAL
4092129 - PROCESS FOR PRODUCING METHANE RICH GAS

EL PASO NATURAL GAS COMPANY
4005996 - METHANATION PROCESS FOR THE PRODUCTION OF AN ALTERNATE FUEL FOR NATURAL GAS

ETHYL CORPORATION
3493610 - PREPARATION OF FORMIC ACID SALTS
4116996 - CATALYST FOR METHANE PRODUCTION

EXXON RESEARCH + ENGINEERING CO.
3450514 - CONTROLLED CONVERSION OF LIGHT NAPHTHA TO TOWN GAS
3617518 - INHIBITION OF HYDROGENOLYSIS
3816298 - HYDROCARBON CONVERSION PROCESS
3901667 - MANUFACTURE OF METHANE-CONTAINING GASES USING AN INTEGRATED FLUID COKING AND GASIFICATION PROCESS
3941819 - CATALYTIC FORMATION OF HYDROCARBONS FROM CO HYDROGEN MIXTURES
3946082 - PREPARATION OF ZEROVALENT PHOSPHINE SUBSTITUTED RHODIUM COMPOUNDS AND THEIR USE IN THE SELECTIVE CARBONYLATION OF OLEFIN S
3958957 - METHANE PRODUCTION
3993457 - CONCURRENT PRODUCTION OF METHANOL AND SYNTHETIC NATURAL GAS
4041087 - METHOD FOR THE DIRECT PREPARATION OF HALOGENATED HYDROCARBONS BY THE REACTION OF CO, H/2 \ AND HALOGEN IN THE PRESENCE O F A CATALYST
4042614 - HYDROCARBON SYNTHESIS FROM CO AND H/2 \ USING RU SUPPORTED ON A TITANIUM OXIDE
4042615 - HYDROCARBON SYNTHESIS FROM CO AND H/2 \ USING NI SUPPORTED ON A TITANIUM OXIDE
4093643 - CATALYTIC FORMATION OF HYDROCARBONS FROM CO, H/2 \ MIXTURES AND PROCESS FOR MAINTAINING CATALYTIC ACTIVITY
4116994 - HYDROCARBON SYNTHESIS FROM CO AND H/2 \ USING RH SUPPORTED ON TITANIUM OXIDES

FLUOR CORPORATION
3795485 - SYNTHESIS GAS GENERATION APPARATUS

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

FORD MOTOR COMPANY
4002658 - METHANATION CATALYST AND PROCESS OF USING THE SAME

FOSTER WHEELER CORPORATION
3615355 - METHOD OF COLLECTING AND TREATING EXHAUST GASES CONTAINING CARBON MONOXIDE

GAS COUNCIL
3511624 - PROCESS FOR PREPARING METHANE-CONTAINING GASES
3625665 - PROCESS FOR THE PRODUCTION OF METHANE CONTAINING GASES
3642460 - PROCESS FOR THE PRODUCTION OF A METHANE-CONTAINING GAS
4032556 - METHANATION OF GASES

GENERAL ELECTRIC COMPANY
3958625 - TRANSPORT OF HEAT AS CHEMICAL ENERGY

GULF RESEARCH + DEVELOPMENT COMPANY
3947483 - METAL CHRYSOTILE METHANE SYNTHESIS CATALYST
4022810 - METAL CHRYSOTILE METHANE SYNTHESIS CATALYST
4088671 - CONVERSION OF SYNTHESIS GAS USING A COBALT-RUTHENIUM CATALYST
4116995 - HYDROCARBON SYNTHESIS USING A RARE EARTH PROMOTED METAL SILICATE

HALDOR TOPSOE A/S
3988262 - METHANATION CATALYST AND PROCESS FOR PREPARING THE CATALYST
4130575 - PROCESS FOR PREPARING METHANE RICH GASES

HARSHAW CHEMICALS LIMITED
3962140 - NICKEL-COPPER-MOLYBDENUM METHANATION CATALYST

IMPERIAL CHEMICAL INDUSTRIES LIMITED
3458289 - CATALYTIC CONVERTER
3694169 - LOW PRESSURE-DROP CATALYTIC REACTOR
3850850 - METHOD OF MAKING A METHANOL SYNTHESIS CATALYST
3923694 - METHANOL SYNTHESIS CATALYST
3940428 - METHANOL PRODUCTION
3950369 - METHANOL PRODUCTION
3957449 - SYNTHESIS PLANT
3975169 - PROCESS FOR PRODUCING A NATURAL GAS SUBSTITUTE
4028067 - PROCESS FOR PRODUCING COMBUSTIBLE GASES
4065483 - METHANOL

INSTITUTE OF GAS TECHNOLOGY
3787468 - METHANATION OF CARBON MONOXIDE AND CARBON DIOXIDE
3884838 - RUTHENIUM-REDUCED AMORPHOUS TUNGSTEN OXIDE CATALYST

INSTITUT FRANCAIS DU PETROLE DES CARBURANTS ET LUBRIFIANTS A
4122110 - PROCESS FOR MANUFACTURING ALCOHOLS, PARTICULARLY LINEAR SATURATED PRIMARY ALCOHOLS, FROM SYNTHESIS GAS
4125566 - PROCESS FOR UPGRADING EFFLUENTS FROM SYNTHESES OF THE FISCHER-TROPSCH TYPE

JAPAN GAS-CHEMICAL COMPANY INC.
3646131 - PROCESS FOR THE CARBOXYLATION OF COMPOUNDS HAVING A REPLACEABLE HYDROGEN ATOM

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

JAPAN GASOLINE CO., LTD
3870738 - PROCESS FOR MANUFACTURING GASES RICH IN METHANE
3917467 - PROCESS FOR MANUFACTURING HIGH PURITY METHANE GAS

JOHNSON MATTHEY + CO., LIMITED
4012450 - CATALYTIC REACTIONS

KELLER CORPORATION
3968999 - METHOD OF MAKING AVAILABLE FUELS FROM ARCTIC ENVIRONMENTS

KRUPP KOPPERS GMBH
3954424 - PROCESS FOR PRODUCING A METHANE-CONTAINING GAS AND ARRANGEMENT THEREFOR
3958956 - METHANE PRODUCTION PROCESS AND ARRANGEMENT THEREFOR
3973923 - PROCESSES FOR THE PRODUCTION OF METHANE-CONTAINING GASES

LINDE AKTIENGESELLSCHAFT
4091008 - PRODUCTION OF A GAS RICH IN METHANE

MANNESMANN ROHRENWERKE AG
4027688 - TRANSPORTATION OF FOSSIL FUEL MATERIALS

MERCK PATENT GESELLSCHAFT MIT BESCHRANKTER HAFTUNG
4026953 - SOLVENTS FOR NMR SPECTROSCOPY

METALLGESELLSCHAFT AKTIENGESELLSCHAFT
3854895 - PROCESS FOR PRODUCING A METHANE-RICH GAS USABLE IN PLACE OF NATURAL GAS
3897471 - PROCESS FOR PRODUCING METHANOL
3898057 - PROCESS FOR CONVERTING METHANOL TO A HIGH-METHANE GAS
3959972 - POWER PLANT PROCESS
3962300 - PROCESS FOR PRODUCING METHANOL
4012404 - PROCESS FOR PRODUCING HIGH-METHANE GAS
4016189 - PROCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS
4045960 - PROCESS FOR PRODUCING ENERGY
4061475 - PROCESS FOR PRODUCING A GAS WHICH CAN BE SUBSTITUTED FOR NATURAL GAS
4087449 - PROCESS FOR PRODUCING METHANOL

MIDLAND-ROSS CORPORATION
3970435 - APPARATUS AND METHOD FOR METHANATION

MITSUBISHI GAS-CHEMICAL COMPANY, INC.
3840478 - CATALYST OF COPPER OXIDE ZINC-OXIDE-CHROMIUM OXIDE FOR METTRANOL SYNTHESIS
3939191 - PROCESS FOR METHANOL SYNTHESIS
3971735 - METHANOL PRODUCTION CATALYST AND PROCESS FOR PREPARING THE SAME

MOBILE OIL CORPORATION
4080397 - METHOD FOR UPGRADING SYNTHETIC OILS BOILING ABOVE GASOLINE BOILING MATERIAL

MOBIL OIL CORPORATION
3894102 - CONVERSION OF SYNTHESIS GAS TO GASOLINE
3972958 - CONVERSION OF COAL TO HIGH OCTANE GASOLINE
3980583 - COMPLEXED METALS BONDED TO INORGANIC OXIDES
3983055 - SYNTHETIC AMORPHOUS SILICAS OF PREDETERMINED PORE DISTRIBUTION METHOD OF PRODUCING SAME

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

MOBIL OIL CORPORATION (CONTINUED)

3998898 - MANUFACTURE OF GASOLINE
4003825 - SYNTHETIC AMORPHOUS SILICAS OF PREDETERMINED PORE DISTRIBUTION, METHOD OF PRODUCING SAME AND PROCESS OF USING SAME
4011275 - CONVERSION OF MODIFIED SYNTHESIS GAS TO OXYGENATED ORGANIC CHEMICALS
4039600 - CONVERSION OF SYNTHESIS GAS TO AROMATIC HYDROCARBONS
4041094 - METHOD FOR UPGRADING PRODUCTS OF FISCHER-TROPSCH SYNTHESIS
4041095 - METHOD FOR UPGRADING C/3 \ PLUS PRODUCT OF FISCHER-TROPSCH SYNTHESIS
4041096 - METHOD FOR UPGRADING C/5 \ PLUS PRODUCT OF FISCHER-TROPSCH SYNTHESIS
4041097 - METHOD FOR ALTERING THE PRODUCT DISTRIBUTION OF FISCHER-TROPSCH SYNTHESIS PRODUCT
4044063 - METHOD FOR ALTERING THE PRODUCT DISTRIBUTION OF WATER WASHED, FISCHER-TROPSCH SYNTHESIS HYDROCARBON PRODUCT TO IMPROVE G ASOLINE OCTANE AND DIESEL FUEL YIELD
4044064 - CONVERSION OF FISCHER-TROPSCH HEAVY PRODUCT TO HIGH QUALITY JET FUEL
4046829 - METHOD FOR IMPROVING THE FISCHER-TROPSCH SYNTHESIS PRODUCT DISTRIBUTION
4046830 - METHOD FOR UPGRADING FISCHER-TROPSCH SYNTHESIS PRODUCTS
4046831 - METHOD FOR UPGRADING PRODUCTS OF FISCHER-TROPSCH SYNTHESIS
4048250 - CONVERSION OF NATURAL GAS TO GASOLINE AND LPG
4049734 - CONVERSION OF COAL TO HIGH OCTANE GASOLINE
4049741 - METHOD FOR UPGRADING FISCHER-TROPSCH SYNTHESIS PRODUCTS
4052477 - METHOD FOR UPGRADING A FISCHER-TROPSCH LIGHT OIL
4053532 - METHOD FOR IMPROVING THE FISCHER-TROPSCH SYNTHESIS PRODUCT DISTRIBUTION
4059648 - METHOD FOR UPGRADING SYNTHETIC OILS BOILING ABOVE GASOLINE BOILING MATERIAL
4071574 - CONVERSION OF FISCHER-TROPSCH HEAVY PRODUCT TO HIGH QUALITY JET FUEL
4076761 - PROCESS FOR THE MANUFACTURE OF GASOLINE
4086261 - METHANATION OVER SYNTHETIC AMORPHOUS SILICAS
4086262 - CONVERSION OF SYNTHESIS GAS TO HYDROCARBON MIXTURES
4093029 - UTILIZATION OF LOW BTU NATURAL GAS
4096163 - CONVERSION OF SYNTHESIS GAS TO HYDROCARBON MIXTURES
4098339 - UTILIZATION OF LOW BTU NATURAL GAS
4098727 - INSOLUBLE POLYMERS HAVING FUNCTIONAL GROUPS CONTAINING CHEMICALLY BONDED GROUP VIII METAL

MONSANTO COMPANY
3433841 - PURIFICATION PROCESS
3466340 - ALCOHOL PURIFICATION PROCESS
3526670 - PROCESS FOR INCREASING PERMANGANATE TIME OF METHANOL
3624165 - PURIFICATION PROCESS

MONTECATINI EDISON S.P.A.
3753662 - SYNTHESIS REACTOR WITH PARTICULAR COOLING MEANS FOR EXOTHERMIC REACTIONS AT HIGH PRESSURE

PARSONS, RALPH M., COMPANY
3938968 - PROCESS FOR THE PRODUCTION OF SUBSTITUTE NATURAL GAS

PHILLIPS PETROLEUM COMPANY
3600145 - PRODUCTION OF METHANE FROM CARBON MONOXIDE AND STEAM
3642915 - PURIFICATION OF ALCOHOLS
3988334 - METHOD FOR METHANATION
4011058 - PRODUCTION OF SUBSTITUTE NATURAL GAS FROM GASIFICATION OF COAL CHAR
4071331 - PROCESS FOR PRODUCING METHANE FROM CARBON MONOXIDE AND STEAM
4079072 - METHANATION PROCESS

PRITCHARD, J. F., AND COMPANY
3501516 - METHOD FOR PRODUCTION OF METHANOL

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

PULLMAN, INCORPORATED
3484197 - PROCESS FOR CARRYING OUT CYCLIC SYNTHESIS REACTIONS AT ELEVATED PRESSURES
3567404 - REACTOR VESSEL
3598527 - AMMONIA AND METHANOL PRODUCTION

RALPH M. PARSONS COMPANY
3999961 - SULFUR CONTROL OVER CARBON FORMATION IN HIGH TEMPERATURE REFORMING OPERATIONS
4050908 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM COAL
4115075 - PROCESS FOR THE PRODUCTION OF FUEL VALUES FROM CARBONACEOUS MATERIALS

RHEINISCHE BRAUNKOHLENWERKE AG
4109701 - METHOD OF CONVEYING HEAT ENERGY

RIO TINTO (RHODESIA) LIMITED
4076612 - PROCESS FOR OBTAINING LIQUID FUEL-OIL AND/OR GASEOUS HYDROCARBONS FROM SOLID CARBONACEOUS FEED STOCKS

RUHRGAS AKTIENGESELLSCHAFT
4082520 - PROCESS OF PRODUCING GASES HAVING A HIGH CALORIFIC VALUE

SAGAMI CHEMICAL RESEARCH CENTER
3842113 - CATALYST FOR REDUCING CARBON DIOXIDE
3842121 - CATALYST FOR REDUCTION OF CARBON MONOXIDE

SHELL OIL COMPANY
3709919 - PRODUCTION OF METHANOL
3758417 - COPPER, ZINC, DIDYMIUM OXIDE-CONTAINING CATALYSTS
3917468 - SYNTHETIC NATURAL GAS PRODUCTION
3979332 - HIGH TEMPERATURE METHANATION WITH MOLTEN SALT-BASED CATALYST SYSTEMS
3996256 - METHANATION CATALYST
4006177 - METHANATION CATALYST RECOVERY
4045461 - HIGH TEMPERATURE METHANATION WITH MOLTEN SALT-BASED CATALYST SYSTEMS

SKF INDUSTRIAL TRADING AND DEVELOPMENT COMPANY B.V.
3852180 - APPARATUS FOR CO/2\ CONVERSION TO METHANE

SNAM PROGETTI S.P.A.
4098809 - PROCESS FOR THE PRODUCTION OF DIMETHYL ETHER

SOCIETE FRANCAISE DES PRODUITS POUR CATALYSE
4126581 - CATALYST CONTAINING COPPER OXIDE AND ZINC OXIDE, ITS MANUFACTURE AND ITS USE FOR THE CONVERSION OF CARBON MONOXIDE

TEXACO DEVELOPMENT CORPORATION
3920717 - PRODUCTION OF METHANOL
3922148 - PRODUCTION OF METHANE-RICH GAS
3980590 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980591 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
3980592 - RECOVERY OF PARTICULATE CARBON FROM SYNTHESIS GAS
4081253 - PRODUCTION OF PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE
4110359 - PRODUCTION OF CLEANED AND PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE

ASSIGNEO PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC.
3709669 - METHANE PROOUCTION
3759679 - PROOUCTION OF METHANE-RICH FUEL GAS
3890113 - PROOUCTION OF METHANE
3927997 - METHANE-RICH GAS PROCESS
3927998 - PRODUCTION OF METHANE-RICH GAS STREAM
3927999 - METHANE-RICH GAS PROCESS
3928000 - PRODUCTION OF A CLEAN METHANE-RICH FUEL GAS FROM HIGH-SULFUR CONTAINING HYDROCARBONACEOUS MATERIALS
3928001 - PROOUCTION OF METHANE
4030981 - PROCESS FOR MAKING OIL FROM AQUEOUS REACTIVE SLUOGES ANO SLURRIES

TOYO-KOGYO CO., LTO.
3615200 - PROCESS FOR CONCENTRATING INERT COMPONENTS IN PRESSURIZEO SYNTHESIS LOOP

UNION CARBIDE CORPORATION
3833634 - MANUFACTURE OF POLYFUNCTIONAL COMPOUNDS
3940432 - PROCESS FOR MAKING ETHYLENE GLYCOL
3944588 - CATALYTIC PROCESS FOR POLYHYORIC ALCOHOLS ANO OERIVATIVES
3948965 - CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS ANO OERIVATIVES
3952039 - CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS ANO OERIVATIVES
3957857 - CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS ANO OERIVATIVES
3968136 - CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS ANO OERIVATIVES
4001289 - ALCOHOL-RHODIUM SEPARATION PROCESS
4013700 - CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS ANO DERIVATIVES
4014913 - PROCESS FOR PROOUCING OXYGENATEO TWO CARBON COMPOUNOS
4064156 - METHANATION OF OVERSHIFTEO FEEO
4096164 - PROCESS FOR PROOUCING ETHANOL, ACETIC ACIO ANO/OR ACETALDEHYOE, FROM SYNTHESIS GAS
4111975 - CATALYTIC PROCESS FOR PROOUCING POLYHYORIC ALCOHOLS AND OERIVATIVES
4115428 - CATALYST AND PROCESS FOR PRODUCING POLYHYORIC ALCOHOLS ANO DERIVATIVES
4115433 - CATALYST ANO PROCESS FOR PRODUCING POLYHYORIC ALCOHOLS ANO OERIVATIVES
4119656 - PREPARATION OF HYDROXYLATED COMPOUNDS FROM SYNTHESIS OF GAS WITH PALLAOIUM CATALYSTS
4124628 - SERIAL AOIABATIC METHANATION ANO STEAM REFORMING
4125553 - PROCESS FOR MAKING OXYGENATED CARBON COMPOUNDS

UNION OIL COMPANY OF CALIFORNIA
3856702 - ALUMINUM BORATE CATALYST COMPOSITIONS
3856705 - ALUMINUM BORATE CATALYST COMPOSITIONS
3988263 - THERMALLY STABLE COPRECIPITATEO CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS
4024171 - ALUMINUM BORATE CATALYST COMPOSITIONS ANO USE THEREOF IN CHEMICAL CONVERSIONS
4042532 - THERMALLY STABLE NICKEL-ALUMINA CATALYSTS USEFUL FOR METHANATION ANO OTHER REACTIONS ANO METHOO FOR THE MANUFACTURE OF S
AIO CATALYSTS
4064152 - THERMALLY STABLE NICKEL-ALUMINA CATALYSTS USEFUL FOR METHANATION
4065484 - METHANATION PROCESS WITH INTERMITTENT REACTIVATION OF CATALYST
4124629 - THERMALLY STABLE COPRECIPITATEO CATALYSTS USEFUL FOR METHANATION ANO OTHER REACTIONS

UNION RHEINISCHE BRAUNKOHLEN KRAFFSTOFF AKTIENGESELLSCHAFT
3690550 - PROCESS FOR TRANSPORTING THERMAL ENERGY

UNITEO KINGOOM ATOMIC ENERGY AUTHORITY
3619365 - NUCLEAR REACTORS ANO COOLANT THEREFOR

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
3957460 - OXIDATION OF COAL-WATER SLURRY FEED TO HYDROGASIFIER
3967936 - METHANATION PROCESS UTILIZING SPLIT COLD GAS RECYCLE
3971634 - HEAT PIPE METHANATOR

UNITED STATES OF AMERICA, DEPARTMENT OF STATE
3989734 - SLURRY PHASE METHANATION PROCESS

UNITED STATES OF AMERICA, INTERIOR
3429679 - PROCESS FOR IMPROVING THE HEATING VALUES OF FUEL GASES
3840354 - THREE-STAGE GASIFICATION OF COAL
3844733 - TWO-STAGE DOWNFLOW GASIFICATION OF COAL
3904386 - COMBINED SHIFT AND METHANATION REACTION PROCESS FOR THE GASIFICATION OF CARBONACEOUS MATERIALS

UNITED STATES OF AMERICA, NAVY
4089812 - MASSIVE CATALYST

UNIVERSITY OF WYOMING
3505204 - DIRECT CONVERSION OF CARBONACEOUS MATERIAL TO HYDROCARBONS

UOP INC.
4010008 - SUBSTITUTED NATURAL GAS VIA HYDROCARBON STEAM REFORMING
4013737 - UPGRADING SYNTHETIC GASOLINE

VENTRON CORPORATION
3847963 - METHANATION PROCESSES

VULCAN-CINCINNATI, INC.
3480407 - MULTIPLE ZONE APPARATUS FOR THE PROCESSING OF FLUIDS HAVING INTERZONE FLUID MIXING AND REDISTRIBUTION FEATURES

W. R. GRACE + CO.
3933883 - METHANATION CATALYST AND PROCESS OF USE

UNASSIGNED PATENTS (1/75-12/78) INVENTORS (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BANQUY	DAVID	L.	39 RUE ST.-PLACIDE	75006 PARIS		FR
3904389 - PROCESS FOR THE PRODUCTION OF HIGH BTU METHANE-CONTAINING GAS						
BLAND	JACKIE	LOU	110 OLDE ENGLISH CT.	LOUISVILLE	KY	40272
3876557 - METALLIC CATALYST						
FUCHS	WARREN		107 CHERRY LANE, LAUREL HOLLOW	SYOSSET, L. I.	NY	11791
3941869 - PROCESS FOR EXOTHERMIC REACTIONS						
JORDAN	ROBERT	KENNETH	CARLTON HOUSE, SUITE 1431, 550	PITTSBURGH	PA	15219
4013454 - COPRODUCTION OF IRON WITH METHANOL AND AMMONIA						

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3625664 - PROCESS FOR THE PRODUCTION OF RICH FUEL TO REPLACE NATURAL GAS BY MEANS OF CATALYTIC HYDROGASIFICATION UNDER P RESSURE OF FLUID HYDROCARBONS
3751228 - APPARATUS FOR REFORMING HYDROCARBONS UNDER PRESSURE
4107089 - CATALYST FOR THE SYNTHESIS OF METHANOL AND METHOD FOR PREPARING SAME

3071453	3122493	3128163	3131212	3156657	3186145	3194644	3240698	3243421	3251648	3254023	3254967
3256208	3271326	3318955	3318955	3326956	3347647	3350170	3351564	3361535	3372988	3373180	3376332
3379505	3384458	3387942	3391064								

II.C. IN VITRO CONVERSION: PROCESSES INVOLVING SYNTHESIS GAS
2. REACTING SYNTHESIS GAS

PATENTING UPDATE (1/79-8/79)

Patent No.	Assignee & Title
4,132,672	American Gas Association, Arlington Va: Methanation Catalyst
4,132,727	Texas Gas Transmission Corporation: Method And Apparatus For The Manufacture Of Methanol
4,133,825	British Gas Corporation: Production Of Substitute Natural Gas
4,133,841	Institut Francais du Petrole, France: Process For Upgrading Effluents From Synthesis Of The Fischer-Tropsch Type
4,134,732	Continental Oil Company: Floating Methanol Plant
4,134,907	Hazen Research Inc.: Process For Enhancing The Fuel Value Of Low BTU Gas
4,134,908	Foster Wheeler Energy Corporation: Methanation Process
4,136,104	Celanese Corporation: Production Of Acetic Acid
4,138,442	Mobil Oil Corporation: Process For The Manufacture Of Gasoline
4,139,550	Suntech, Inc.: Aromatics From Synthesis Gas
4,139,551	The Rafel Industrial Group Ltd., Hamilton, Bermuda: Catalyst For Methane And Ethane Synthesis
4,140,602	Texas Gas Transmission Corporation: Method For Obtaining Carbon Dioxide From The Atmosphere And For Production Of Fuels
4,142,993	The Research Council of Alberta: Transition Metal Catalyst
4,146,503	Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany: Process For Preparing A Catalyst For Reducing Carbon Monoxide
4,146,504	Graham Magnetics Inc.: Porous Powders And A Method For Their Preparation
4,149,940	Imperial Chemical Industries Ltd: Methanol

4,151,190 The Dow Chemical Company: Process For Producing C_2-C_4 Hydrocarbons From Carbon Monoxide And Hydrogen

4,151,191 The American Gas Association: Sulfur Resistant Molybdenum Catalysts For Methanation

4,151,192 Union Carbide Corporation: Promoting N-Propyl Alcohol Formation With Vanadium Compounds

4,152,407 Warren Fuchs, 107 Cheny La, Syosset, N.Y. 11791: Process And Apparatus For Exothermic Reactions

4,153,623 Union Carbide Corporation: Promoting Propylene Glycol Formation With Compounds Of Aluminum

4,154,751 Exxon Research & Engineering Co: Preparation And Use Of Supported Potassium (or Rubidium) - Group VIII - Metal Cluster Catalysts In CO_2/H_2 Fischer - Tropsch Synthesis Reactions

4,155,928 Phillips Petroleum Company: Methanation Of Carbon Monoxide Over Tungsten Carbide Containing Catalysts

4,157,338 Mobil Oil Corporation: Conversion Of Synthesis Gas To Hydrocarbon Mixtures

4,158,637 Westinghouse Electric Corp.: Conversion Of Coal Into Hydrocarbons

4,159,236 Gulf Oil Corporation: Method For Combining Coal Liquefaction And Gasification Processes

4,159,237 Gulf Oil Corporation: Coal Liquefaction Process Employing Fuel From A Combined Gasifier

4,159,238 Gulf Oil Corporation: Integrated Coal Liquefaction Gasification Process

4,159,995 Mobil Oil Corporation: Conversion Of Synthesis Gas To Hydrocarbon Mixtures Utilizing Dual Reactors

4,160,649 UOP, Inc.: Substituted Natural Gas Via Steam Reforming Of Kerosene

4,161,489 Mobil Oil Corporation: Conversion Of Mixtures Of Carbon Oxides And Hydrogen

4,162,145 Phillips Petroleum Company: Regeneration Of Liquid Absorbents

4,162,261 Union Carbide Corporation: Novel Solvents For The Catalytic Process For Making Polyhydric Alcohols

4,162,262 Union Carbide Corporation: Process For Producing Two-Carbon Atom Compounds From Synthesis Gas With Minimal Production Of Methanol

APPENDIX A - EXPLANATORY NOTES

Composite Total (Part 2B): Part 2C of each profile comprises an alphabetical listing of assignees. In some instances, assignees are listed in more than one place due to variations in the printing of the name. These variations occur for a number of reasons, such as typographical errors, changes in company names or differences in spacing or abbreviations. In Part 2B of each profile, which ranks assignees according to number of patents held, the number of patents listed for certain assignees may be a composite resulting from the combination of different titles which in fact signify identical assignees. An asterisk appears next to these totals. This will alert the reader that the particular assignee is listed under more than one title in Part 2C. Such assignees are listed below.

For: BRANDON, ORPHA B.
See Also: ORPHA BRANDON

For: ENGELHARD MINERALS + CHEMICALS CORPORATION
See Also: ENGELHARD INDUSTRIES, INC.

For: FIRMA CARL STILL
See Also: FIRMA CARL STILL RECKLINGHAUSEN, and RECKLINGHAUSEN, CARL STILL, FIRMA

For: HEINRICH KOPPERS GMBH
See Also: KOPPERS, HEINRICH, GESELLSCHAFT MIT BESCHRANKTER HAFTUNG and HEINRICH KOOPERS GMBH

For: MOBIL OIL CORPORATION
See Also: MOBILE OIL CORPORATION

For: OIL SHALE CORPORATION
See Also: OIL SHALE CORPORATION (TOSCO)

For: RALPH M. PARSONS COMPANY
See Also: PARSONS, RALPH M., COMPANY

For: RHEINISCHE BRAUNKOHLENWERKE AG
See Also: REINISCHE BRAUNKOHLENWERKE A.G.

For: SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ, B.V.
See Also: SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ, B.V.

For: STEAG AG
See Also: STEAG AKTIENSELLSCHAFT

For: TENNECO OIL COMPANY
See Also: SENNECO OIL COMPANY

For: UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY
See Also: UNITED STATES OF AMERICA, ATOMIC ENERGY COMMISSION

Application Filing Date: The application filing date information as set forth in Parts 1 and 2A of the profiles is determined by taking all of those patents which issued between 1967 and 1978 and distributing them yearly based on the date when the application was filed. Patents which were granted prior to 1967 are not included since the application date information for these patents is not in the data base. Also, applications which were filed but never issued (roughly 30% of the total filings), as well as those applications which were still pending as of December 31, 1978 are not included. Thus, only those applications which were filed and subsequently became patents with patent grant dates between 1967 and 1978 are included.

While the length of time between the patent application date and the patent grant date varies, the current pendency is approximately 20 months. Clearly many applications filed in 1978 were still pending at the end of 1978, as were a number of those filed in 1977. While a small number of applications which were filed prior to 1977 were still pending, OTAF feels that the application date data prior to January 1977 is essentially complete. That is, the number shown for applications filed in the years prior to 1977 will not differ substantially with the passage of time, and this number is a true reflection of the number of applications filed in that year which have and will become patents. However, for the subsequent years, 1977 and 1978, that number will increase as more applications become patents.

For those years prior to 1967, it should be remembered that the numbers reflect only those applications which became patents between 1967 and 1978. Thus, the column "pre 65" does not reflect all applications filed before 1965 but only those which issued in 1967 and subsequently. The graph of this information in Part 1 of each profile is limited to the years 1967 to 1976 and thus is an essentially accurate reflection of activity based on the application dates of subsequently issued patents.

Assignee - This term refers to companies, organizations or individuals to which the inventor's titles and rights to a patent are assigned. For the purpose of this publication, the assignee will in all cases refer to the assignee at the time the patent was granted. Approximately 80% of all U.S. patents are assigned when granted. By far, the largest portion of assignees are corporations.

Country Codes - The following country codes appear in Part 2D of this profile. Due to changes in codes during the period covered, some countries are identified by more than one code.

BR - Brazil
CA - Canada
CT - China (Taiwan)
DE - Federal Republic of Germany
DT - Federal Republic of Germany
FR - France
JA - Japan
SU - Union of Soviet Socialist Republics
SW - Sweden
TW - China (Taiwan)
ZA - South Africa

APPENDIX B

OBTAINING PREVIOUS OTAF PUBLICATIONS**

Copies of the previous OTAF publications listed below are available from:

National Technical Information Service (NTIS)
5285 Port Royal Rd.
Springfield, Virginia 22161
(703) 557-4690

When ordering from NTIS, please give the publication title and its "COM" or "PB" number.

1. Initial Publication, May 1973
   COM 73-10767; Cost: Domestic - $6.50 Foreign - $13.00
   Describes OTAF program and gives sample reports on 24 wide ranging areas of technology in varying levels of detail.

2. Early Warning Report, December 1973
   COM 74-10150; Cost: Domestic - $11.00 Foreign - $22.00
   Spotlights those technological areas experiencing a high level of overall activity or of foreign activity. Reviews patent activity in a number of energy areas, including nuclear; solar; geothermal; and tide, wind and wave energy.

3. Third Report, June 1974
   COM 74-11383; Cost: Domestic - $9.00 Foreign - $18.00
   Presents an overview of the technological activity, across all technologies, of a group of selected foreign countries and a group of selected U.S. states. Extends energy area treatments to include oil shale and coal gasification technologies. Reviews additional high overall activity technological areas.

4. Fourth Report: A Review of Patent Ownership, January 1975
   COM 75-10050; Cost: Domestic - $7.25 Foreign - $14.50
   Identifies the 73 corporations and government agencies which received 500 or more patents during the five year period 1969-1973, and reviews and compares their patent activity across the spectrum of technology. Also reviews in terms of patent ownership, the patent activity during the same period, in nuclear energy technology and oil shale and coal gasification technology.

5. Fifth Report, August 1975
   COM 75-11142, Cost: Domestic - $8.00 Foreign - $16.00
   Reviews 60 technological areas, not previously reported on, experiencing a high level of overall activity or of foreign activity. Presents patent activity data in categories corresponding to 36 Product Fields of the Standard Industrial Classification System.

** SPECIAL NOTE: NTIS AND GPO PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

6. Sixth Report, June 1976
PB 254188, Cost: Domestic - $9.00 Foreign - $18.00
Reviews 15 technologies with unusually high activity by foreign resident inventors, and 22 high overall activity technologies; updates the 1973 reports on patent activity in solar and other natural energy sources, and adds reports on the use of waste material and wind for energy generation. Presents comparisions of patenting to R&D expenditures and R&D manpower allocations in six selected industries. The report concludes with a review of six most often cited patents in 1975, 5 U.S. and 1 foreign patent.

7. Seventh Report, March 1977*
PB 265792, Cost: Domestic - $9.25 Foreign - $18.50
Reviews historical patenting and trademark registration trends, and includes the most extensive collection of historical U.S. patent data ever presented in a single publication. Makes first use in the series of data relating to patents granted by foreign nations for a study of invention sources. Makes first use in the series of pending patent application data for forecasting. Presents brief reviews of 16 technologies experiencing high overall or foreign patent activity. Concludes with the series most comprehensive assessment of activity in a given technology, specifically in computer memeories.

8. Eighth Report, December 1977*
PB 276375, Cost: Domestic - $7.25 Foreign - $14.50
Reviews U.S. patenting in the context of domestic vs. international patenting and analyzes the balance of patenting between the U.S. and other countries. Presents a study demonstrating the uniqueness of patents and the patent file as a technological resource. Concludes with an in-depth analysis of patent activity in geophysical exploration for hydrocarbons.

9. Ninth Report, March 1979*
PB 293380 Cost: Domestic - $9.00 Foreign - $18.00
Reviews,"Top Fifty" most active technologies (U.S.P.C. subclasses) in three categories -- Most Active ; Fastest Growing, and Most Foreign-Active -- for each of three broad groupings of technology -- Chemical, Electrical and Mechanical. Examines trends in domestic patenting and independent inventor patenting. Includes an extensive review of patenting in "Ferrous Metal" technologies. Concludes with a discussion of two experiments in the transfer of "appropriate technology" to small businesses and developing countries.

NTIS Microfilm of Previous Reports
Domestic - $3.00 per report; Foreign - $4.50 per report

*NOTE: The Seventh, Eighth, and Ninth Reports may also be obtained from the Superintendent of Documents; U.S. Government Printing Office; Washington, D.C. 20402. Their identification numbers and costs are:

- Seventh Report 003-004-00542-4, price: Domestic **$4.25;
- Eighth Report 003-004-00550-5, price: Domestic **$3.75;
- Ninth Report 003-004-00559-9, price: Domestic **$4.00.

**Add 25% handling cost for foreign orders

APPENDIX C

OBTAINING ADDITIONAL INFORMATION OR SPECIAL REPORTS

Background

OTAF's computerized base of data relating to the patent file includes, at present:

- all subclasses of the U.S. Patent Classification System
- the relationship of all subclasses of the U.S. Patent Classification System to the Standard Industrial Classification System in 55 Product Fields and Product Field combinations
- for U.S. patents issued since 1963,
  - the ownership at time of issue in seven categories (U.S. government, foreign government, U.S. corporation, foreign corporation, U.S. individual, and unassigned)
  - the country or state of residence of the inventor
- for U.S. patents issued since 1967,
  - the date the application for patent was filed in the U.S. Patent and Trademark Office
- for U.S. patents issued since 1969,
  - the specific (i.e. named) ownership of all patents which, at time of issue, were organizationally owned (e.g., by a corporation, foundation, government agency).
  - the patent title
- for U.S. patents issued since 1975,
  - the address of the inventor, and the field of search and references cited in the patentability examination leading to the patent grant.

Special Reports

Data can be retrieved on the basis of any one or any combination of the factors listed above, manipulated on most any given basis and presented in a number of formats, e.g., lists, tables, graphs, charts, etc. This flexiblity is illustrated by the various types of reports presented in this Appendix and in the nine OTAF previous general distribution publications.

OTAF has developed several standard special report programs which are designed to extract and present, for any given grouping of patents, a wide variety of data. Excerpts from samples of reports prepared using these programs are included in this Appendix.

STANDARD SPECIAL REPORTS

"Technology Profile" Report

This is a multi-part report utilizing many of the elements in OTAF's data base to provide a detailed patent profile for a specific technology or grouping of technologies. Information provided includes rate of patenting, origin of patenting, type of assignment and specific assignment, patent numbers and their titles, and names and addresses of "independent" inventors. There are four parts (parts A,B,C,&D) which comprise a complete report. Part A includes patenting activity percentages, general assignment and distribution of origin of patents; Part B includes, by assignee, the numbers of patents granted by both year of application filing and grant date, ranked by assignee with highest number of patents; Part C includes, alphabetically, the assignees and their specific patent numbers and titles; Part D gives the name and address of the inventors of patents unassigned at time of issue. Any Part can be prepared depending on your needs. This PATENT PROFILES publication is itself an example of the kinds of data presented in a "Technology Profile" report.

"Organizational Profile" Report

Beginning on page 225 are excerpts from the second of OTAF's standard format special reports. The sample report profiles the patent activity across the classes and subclasses of the U.S. Patent Classification system. A report for Communications Satellite Corp. is given as an example. Two pages of the 40 page report are included. This type of report can be prepared, for example, on the patents of any organization or grouping of organizations, or on the patents granted to the residents of any state or country or grouping of states or countries.

Multi-Corporate Patent Activity Profile

Like the above described Organizational Profile, this report also profiles 1969-1978 patent activity across the classes and subclasses of the U.S. Patent Classification System. In this report the activity of up to eight organizations can be profiled simultaneously, facilitating comparisons between organizations. Unlike the Organizational Profile no patent numbers or patent titles are given.

SIC Product Field Reports

On pages 227 to 229 is a listing of Standard Industrial Classification (SIC) Product Fields for which a concordance exists with subclasses of the U.S. Patent Classification System. Special patent reports, such as the "Technology Profile" Report can be prepared for any of these Product Fields.

How to Obtain Special Reports

1. In making an initial determination of interest in a special OTAF report, you are urged to review the data items that are available and decide if any one or combination of them, or any relationship between two or more of them, might be useful to your needs. Special attention should be given to the standard format reports to determine if these multi-purpose, relatively low cost reports would meet your needs.

2. In most instances, interest, once determined, will be limited to particular technological areas or to particular organization owning patents. In the case of technological areas, their definition is of key importance and must ultimately be in terms of classes and sub-classes of the U.S. Patent Classification System (or one of the 55 SIC Product Fields or Field combinations). If you are unfamiliar with the U.S. Patent Classification System, develop as clear and precise an explanation of your area(s) of interest as possible. For assignment information, the parent organization and its subsidiaries of interest should be identified. Recent name changes (e.g. Esso-Exxon), if known, should be indicated.

3. At this point, you should contact OTAF, indicate the type of information you desire and, if you wish, what your needs are. (Perhaps alternatives can be suggested to better meet those needs). If you cannot provide class and subclass definition of your area of interest, OTAF will attempt to do that for you, using your description of the area.

4. Once there is a clear mutual understanding of the information you want, the format in which you want it and the area(s) to be included, an estimate of cost will be developed and provided to you along with a statement of the work to be done.

5. Once agreement on work to be done and cost is reached, and payment is received, the report will be prepared and provided.

Costs

All special reports are prepared on a cost reimbursable basis. These costs may vary widely - from as low as $50.00 for some forms of our standard format reports, to several thousand dollars for complex and large scale treatments of many technological categories, requiring extensive professional time, or programming and/or computer time. Cost estimates for specific requested special reports will be provided prior to report preparation.

Whom to Contact

Inquiries concerning OTAF publications/services are invited and should be directed to:

Office of Technology Assessment
and Forecast
U.S. Patent and Trademark Office
Washington, D.C. 20231
Phone: (703) 557-3050

SAMPLE ORGANIZATIONAL PROFILE REPORT - COMMUNICATIONS SATELLITE CORPORATION

EXPLANATION OF DATA

DESCRIPTION OF PATENT PROFILES

THE REPORT PROFILES ONLY THOSE PATENTS FALLING INTO A PARTICULAR "CATEGORY" (E.G., SPECIFIC OWNERSHIP, COUNTRY OR STATE OF INVENTOR RESIDENCE), BY THE U.S. PATENT CLASSIFICATIONS INTO WHICH THOSE PATENTS HAVE BEEN PLACED.

EACH MAJOR PATENT CLASSIFICATION (CLASS) IS IDENTIFIED BY ITS TITLE. THEN, FOR EACH OF THE SUBCLASSES WITHIN THAT CLASS WHEREIN PATENTS FROM THE "CATEGORY" HAVF BEEN PLACED, THE FOLLOWING ARE GIVEN:

--TOTAL PATENTS
--OR (ORIGINAL) PATENTS
--XR (CROSS-REFERENCE) PATENTS
--PCT (PERCENT) OF TOTAL OR WITHIN THE "CATEGORY"
--PCT (PERCENT) OF ALL (OR & XR) PATENTS WITHIN THE "CATEGORY"

ALSO GIVEN ARE THE PATENT NUMBERS OF THE "CATEGORY" PATENTS IN THAT CLASSIFICATION. THE TYPE OF CLASSIFICATION (OR orXR) ASSIGNED TO EACH PATENT IS SHOWN IN PARENTHESES FOLLOWING THE PATENT.

FOR PATENTS ISSUING IN 1969 AND SUBSEQUENTLY, THE PATENT TITLES ARE GIVEN. (NOTE: ANY SYMBOLS IN A PATENT TITLE WHICH ARE NOT AVAILABLE ON THE COMPUTER PRINTER ARE SPELLED OUT, EG., β IS SHOWN AS BETA. SUPERSCRIPTS AND SUBSCRIPTS ARE INDICATED BY ENCLOSURE BETWEEN UPWARDLY OR DOWNWARDLY FACING SLASHES, E.G. , H_2O IS SHOWN AS H/2 \O AND Y^2X IS SHOWN AS Y \2/X.)

PATENTS INCLUDED IN PROFILE

THE PATENTS INCLUDED IN THE REPORT ARE THOSE WHICH, ACCORDING TO THE DATA OF RECORD IN THE OTAF COMPUTER DATA BASE, FALL WITHIN THE CATEGORY COVERED IN THE REPORT. THESE CATEGORY DATA ARE RECORDED AT THE TIME OF PATENT ISSUE AND ARE ESSENTIALLY ACCURATE. HOWEVER, ANY PATENT LISTING OR DATA PROVIDED IN THIS REPORTSHOULD NOT BE CONSIDERED TO BE INCLUSIVE OF ALL RELEVANT PATENTS, NOR EXCLUSIVE OF ALL NON-RELEVANT PATENTS.

OTAF SPECIAL REPORT
CLASSIFICATION PROFILE - (1969 - 1977) PATENTS ASSIGNED TO THE COMMUNICATIONS SATELLITE CORP. (COMS

CLASS 178 - TELEGRAPHY

SUBCLASS 66 P (CONTINUED)

3525945 (XR) - SYSTEM FOR RECONSTITUTING A CARRIER REFERENCE SIGNAL USING A SWITCHABLE PHASE LOCK LOOP
3594651 (XR) - QUADRIPHASE MODEM

SUBCLASS 67	TOTAL	3	(OR)	1	(XR)	2	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.6

3806647 (OR) - PHASE AMBIGUITY RESOLUTION SYSTEM USING CONVOLUTIONAL CODING-THRESHOLD DECODING
3707680 (XR) - DIGITAL DIFFERENTIAL PULSE CODE MODULATION SYSTEM
3736507 (XR) - PHASE AMBIGUITY RESOLUTION FOR FOUR PHASE PSK COMMUNICATIONS SYSTEMS

SUBCLASS 68	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2

3484782 (XR) - BI-ORTHOGONAL CODE GENERATOR

SUBCLASS 69.1	TOTAL	4	(OR)	1	(XR)	3	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.8

3575554 (OR) - FRAME SYNCHRONIZER FOR A BI-ORTHOGONAL DECODER
3509471 (XR) - DIGITAL PHASE LOCK LOOP FOR BIT TIMING RECOVERY
3730998 (XR) - TDMA SATELLITE COMMUNICATIONS SYSTEM WITH AN APERTURE WINDOW FOR ADQUISITION
3812430 (XR) - TDMA SATELLITE COMMUNICATIONS SYSTEM WITH IMPROVED ACQUISITION

SUBCLASS 79	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2

3484782 (XR) - BI-ORTHOGONAL CODE GENERATOR

TOTAL CLASS 178	TOTAL	13	(OR)	2	(XR)	11	PCT OF TOTAL OR	1.4	PCT OF ALL (OR+XR)	2.6

CLASS 179 - TELEPHONY

SUBCLASS 1 VC	TOTAL	5	(OR)	5	(XR)	0	PCT OF TOTAL OR	3.6	PCT OF ALL (OR+XR)	1.0

3712959 (OR) - METHOD AND APPARATUS FOR DETECTING SPEECH SIGNALS IN THE PRESENCE OF NOISE
3832491 (OR) - DIGITAL VOICE SWITCH WITH AN ADAPTIVE DIGITALLY-CONTROLLED THRESHOLD
3878337 (OR) - DEVICE FOR SPEECH DETECTION INDEPENDENT OF AMPLITUDE
3890467 (OR) - DIGITAL VOICE SWITCH FOR USE WITH DELTA MODULATION
4008375 (OR) - DIGITAL VOICE SWITCH FOR SINGLE OR MULTIPLE CHANNEL APPLICATIONS

SUBCLASS 1 P	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2

4008375 (XR) - DIGITAL VOICE SWITCH FOR SINGLE OR MULTIPLE CHANNEL APPLICATIONS

SUBCLASS 15 AD	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2

3928804 (XR) - ZONE SHARING TRANSPONDER CONCEPT

SUBCLASS 15 AE	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2

3707680 (XR) - DIGITAL DIFFERENTIAL PULSE CODE MODULATION SYSTEM

SUBCLASS 15 AF	TOTAL	1	(OR)	1	(XR)	0	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.2

SIC PRODUCT FIELDS

PRODUCT FIELDS	SIC CATEGORY
Food and Kindred Products	20
Textile Mill Products	22
Chemicals and Allied Products	28
Chemicals, Except Drugs & Medicines	281, 282, 284-289
Basic Industrial Inorganic & Organic Chemistry	281, 286
Industrial Inorganic Chemistry	281
Industrial Organic Chemistry	286
Plastics Materials & Synthetic Resins	282
Agricultural Chemicals	287
All Other Chemicals	284, 285, 289
Soap, Detergents, and Cleaning Preparations, Perfumes, Cosmetics & Other Toilet Preparations	284
Paints, Varnishes, Lacquers, Enamels, and Allied Products	285
Miscellaneous Chemical Products	289
Drugs and Medicines	283
Petroleum & Natural Gas Extraction & Petroleum Refining	13, 29
Rubber & Miscellaneous Plastics Products	30
Stone, Clay, Glass and Concrete Products	32
Primary Metals	33, 3462, 3463
Primary Ferrous Products	331, 332, 3399, 3462
Primary & Secondary Non-Ferrous Metals	333-336, 339 (except 3399), 3463
Fabricated Metal Products	34 (except 3462, 3463, 348)

PRODUCT FIELDS	SIC CATEGORY
Machinery, Except Electrical	35
Engines & Turbines	351
Farm & Garden Machinery & Equipment	352
Construction, Mining & Material Handling Machinery & Equipment	353
Metal Working Machinery & Equipment	354
Office Computing & Accounting Machines	357
Other Machinery, Except Electrical	355, 356, 358, 359
Special Industry Machinery, Except Metal Working Machinery	355
General Industrial Machinery & Equipment	356
Refrigeration & Service Industry Machinery	358
Miscellaneous Machinery, Except Electrical	359
Electrical and Electronic Machinery, Equipment and Supplies	36, 3825
Electrical Equipment, Except Communication Equipment	361-364, 369, 3825
Electrical Transmission & Distribution Equipment	361, 3825
Electrical Industrial Apparatus	362
Other Electrical Machinery, Equipment & Supplies	363, 364, 369
Household Appliances	363
Electrical Lighting & Wiring Equipment	364
Miscellaneous Electrical Machinery, Equipment & Supplies	369

PRODUCT FIELDS	SIC CATEGORY
Communication Equipment & Electronic Components	365-367
Radio & Television Receiving Equipment, Except Communication Types	365
Electronic Components & Accessories & Communication Equipment	366-367
Transportation Equipment	37, 348
Motor Vehicles & Other Transportation	348, 371, 373-376, 379
Motor Vehicles & Motor Vehicles Equipment	371
Guided Missiles & Space Vehicles & Parts	376
Other Transportation Equipment	373-375, 379 (except 3795)
Ship & Boat Building & Repairing	373
Railroad Equipment	374
Motorcycles, Bicycles & Parts	375
Miscellaneous Transportation Equipment	379 (except 3795)
Ordinance Except Missiles	348, 3795
Aircraft & Parts	372
Professional & Scientific Instruments	38 (except 3825)

APPENDIX D

ACKNOWLEDGEMENTS

Patent and Trademark Office contributors to this publication are listed below. Special thanks are extended to Patent and Trademark Office professional and technical personnel whose continuing input to the Technology Assessment and Forecast program is indispensable.

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